JAN 9 1957

No. 264 DECEMBER 1956 Vol. LXVI

THE ECONOMIC JOURNAL

THE QUARTERLY JOURNAL OF THE ROYAL ECONOMIC SOCIETY

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THE ECONOMIC JOURNAL

DECEMBER 1956

HOW SHOULD WE CONTROL MONOPOLY?: I[1]

ANYONE who was himself a student of monopoly and the regulation of monopoly in the public interest before the war and who now returns to the subject after an interval cannot but be impressed by the immense addition to knowledge that has come from the work of what has hitherto been known since 1948 as the Monopolies and Restrictive Practices Commission. In the 1930s many of us were not only worried by the lack of protection against monopoly, and by what seemed to an economist, and sometimes, I think, even to a lawyer, as a progressive whittling away, through the various decisions of the courts, of the general principle that contracts in restraint of trade were unenforceable. We were also worried by the lack of knowledge of what restrictive practices existed, and what effects they had on the industry in which they operated and on the economy as a whole. Anyone who has read the eleven reports of the Commission must feel infinitely grateful to the Commission for the extraordinary thoroughness of their work and for the searching inquiries they have made into all the effects, good and bad, of the ways in which the industries referred to them have been operated. It has been said that the work of the Commission has been slow and that it would take a generation to survey the whole of British industry. That may or may not be true. But I do myself think that a thorough, searching and impartial investigation of a relatively small number of industries has been more valuable, in enabling one to form judgments of a range of typical situations and practices, than more rapid and more superficial investigation would have been.

Quite apart from these additions to our knowledge, I think we have had over the past twenty years an advance in our analytical thinking within the field of economics itself. Beginning with theoretical studies of duopoly and oligopoly, and going on to studies of price-leadership, I think we have come to understand more clearly the relation of market structure to price-formation, and to think of monopoly not so much in terms of black and white as of one end of a continuum—we have come increasingly to recognise that something almost indistinguishable from monopoly price may emerge in an industry in which, without any sort of agreement, written or tacit, firms follow

[1] This and the two following addresses formed the opening of a discussion on this topic at the Annual General Meeting of the Royal Economic Society on Wednesday, June 27, 1956. All three have been considerably abbreviated for publication.

a price-leader or make certain not at all improbable assumptions about each other's actions. Equally we have come to recognise that what is formally a monopoly—in the sense that one producer is turning out a very large part of total output—may be so weak a monopoly that its prices depart little if at all from the prices that would rule under competition. I think, for example, of the market situation of one producer who in that sense was a monopolist, but who was selling a large part of his output to a large and very efficient mass-assembly plant. His very keen competitors, he told me, were the cost-accountants of the firm to which he was selling: if his price was above the cost at which they thought they could produce for themselves, they would immediately establish a department of their own to produce his product. His was perhaps the limiting case of a weak monopolist, with no power to prevent entry, and depending wholly on the economies of large scale.

As a consequence, I would argue, of this development and clarification of economic thinking, we have come, I think, to emphasise more strongly the importance of market structure, and in particular the importance of freedom of entry into an industry. We have come also, I think, to place rather less emphasis on either the proportion of output in the hands of a single producer or association of producers—though this may be evidence of a particular market structure—or on formal agreements, except so far as these are agreements to prevent entry and to discriminate in favour of an approved and limited group and against new entrants. We are more concerned with the assumptions, of which entrepreneurs may hardly even be aware, as to how their competitors will behave and how they will respond to a change of prices by one producer.

This emphasis on the structure of the market has, as I see it, been reinforced by another line of thought and experience. I believe it is true to say that those who were nearest to war-time experience in attempting to control prices are most sceptical of the likelihood of exercising effective direct control over monopoly pricing in peace-time. In war-time one can hope to prevent flagrant exploitation of a state of scarcity. In peace-time it is infinitely more difficult to establish what are or are not reasonable rates of profit; what are or are not reasonable managerial salaries; what are or are not reasonable rates of amortisation of capital; whether the firm is efficiently run and reasonably progressive. Those who are conscious of these difficulties are the more anxious to create a market situation in which industry, of its own volition, establishes so near as is practicable the prices that are desirable.

I emphasise this because it seems to me to have a relevance to what appears to be the central theme of our attempts to control monopoly. As I see it, we have no doctrinaire view that concentration of output in a few hands is bad *per se*, and apart from any consequence it may have upon prices, output, the pursuit of efficiency and similar more fundamental tests of actual performance. I think I would go further and say that there is increasing scepticism as to whether the breaking up of a more formal monopoly and its replacement by oligopoly will so fundamentally change the essential market

structure that one can say with confidence that the last stage is better than the first. One may indeed forfeit real economies of scale and specialisation, and produce a situation that is actually worse than the first.

I wonder whether I should also be right if I detected not only in recent thought, but also in recent action—or rather priorities of action—a view that, as a very broad generalisation, monopolies of the cartel type—associations of independent firms to maintain prices or to limit entry—have less good in them, to set against any damage they may do, than monopolies involving closer relations—monopolies of the merger type which yield economies of scale, of standardisation and of specialisation. It is, of course, quite unrealistic to divide monopolies crudely into these two main types. The investigations of the Commission have provided examples of cartel-type associations which do in fact result in greater specialisation of individual plants and longer runs of production than would probably emerge if there were imperfect competition and suppliers aimed to provide a full line of goods and services. But, by and large, I believe that we should be right in looking with rather special vigilance at cartel-type organisations. And I think we are increasingly coming to be aware of their ramifications.

I myself feel less concerned about the effects of the large single-firm monopoly than cartel-type monopoly for a second reason also. In a world that is rapidly advancing in technique it is necessary to look at the effects of any market structure not only statically and in the present but also in relation to research, innovation and progress. It is not difficult to show analytically that there are cases in which it may pay a monopolist to suppress innovations or to delay them. I have no doubt that cases may be discoverable in which that has happened. On the other hand, if, as is not infrequently true, the basis of the monopoly is the efficiency of large-scale, the monopolist has a rather special interest in maintaining his technical lead, provided always that entry is free. It is also true that a monopolist can gain more from his own research than a member of a competitive industry, who knows that his research will benefit his competitors as well as himself. In actual practice, I believe to be true in this country what Professor Galbraith has said of the United States, that if one seeks examples of innovation and of research applied to improvements of techniques, of materials, of quality of products, one will find the monopolists very often in the lead, and very competitive industries sometimes, but not always, in the rear. On the other hand, it would not be difficult to quote cases of monopolies which seem to be taking the advantage of their monopoly position in technical slumber. Where the industry cannot support more than a single optimum-sized firm, and more particularly where they are makers of machinery for other industries, the problem of awaking them becomes very serious. Free imports and temporary dependence on foreign supplies is an unsatisfactory solution to a country with a strained balance of payments, but may be the only remedy.

I have said that I think the first and most powerful defence against the undesirable consequences of monopolistic concentration is freedom of entry. If there is freedom of entry, the sources of monopoly power to exploit the

market are limited: they are represented by the economies of larger scale of operations than a new entrant can assume; by goodwill which may easily become ill-will if over-exploited; by the advantages in some cases of using intra-marginal resources rather than marginal resources; by the opportunity —which I would agree with Mr. Andrews is seldom seized because it damages the long-run prospects of the firm—of making hay while the sun shines, by exploiting the market in the short period before competition can become effective. If monopoly power is limited to that extent how serious is it? I would like to know the judgment of others on this question. I fully realise that one can show analytically that the economies of scale will not be exhausted. I believe we know far too little at present statistically and practically about the actual extent of economies of scale. If they are great the damage may be great, but if, as I suspect, they are often beyond a point relatively small, and if the threat of new competition, or of the expansion of existing competitors is real, the damage may be less than is sometimes supposed.

I have said that freedom of entry is the first defence. I believe that the light of day—knowledge of what is being done—is the second and almost equally effective defence. I am glad that registration of all restrictive-trading agreements is to be required. I am glad that the Bill includes a provision that, with certain reasonable exceptions, the register is to be open to public inspection. It is already, I think, clear that in a number of cases participants to restrictive agreements are asking themselves whether certain objectionable features of agreements that will have to be registered are really desirable, or even necessary to fulfil the objectives of the agreement. I sincerely hope that freedom of public inspection of the register will never be surrendered.

I come now to the much more controversial questions of the present Bill. As the result, first, of its detailed inquiries into ten industries, and, second, of the more generalised reference to the problems of collective discrimination, the Commission, and through it the Board of Trade, has acquired a sufficient knowledge of the operation of certain types of collective agreement for it to form a general view of the effects of these agreements. The time seemed clearly to have come for a wider and somewhat more rapid application of the results of its thinking than was possible by a continuation of the remission to it of individual cases. A majority of the Commission recommended, as you will know, not only the registration of agreements but also the general prohibition of the practices of collective discrimination that they had agreed in holding to be undesirable. They suggested that it was better on balance to prohibit them and to provide a machinery to deal fairly and expeditiously with exceptional cases in which there might be justification, than to deal with cases individually, only prohibiting after individual examination. They set out certain grounds on which exception might, as they saw it, legitimately be made. But if I understand them aright, these exceptional justifications did not represent exceptions which they had encountered in their work and would be prepared to justify, but arguments which they could realise might in some case they had not encountered conceivably provide justification.

The President of the Board of Trade has not felt able to go the whole way with them. He has preferred in his Bill to provide for registration, and for submission by the Registrar of cases which he believes to be incapable of justification to a Restrictive Practices Court, composed of one High Court Judge and two other members of the Court, each "qualified by virtue of his knowledge of or experience in industry, commerce or public affairs." The Court, after examination of the agreement, may make an order restraining the parties to it from enforcing it, or making any other agreement to the same effect.

I think there are clearly two major issues here. First, the method proposed by the new Bill requires examination of each and every agreement before prohibition. Even if many agreements are abandoned by the parties to them without waiting for them to be brought before the Court, this must be a slow business. It very much remains to be seen how far the Court can establish precedents, and how far its early decisions will result in wide abandonments of agreements. If it finds that each case is very much an individual case on its own, the pace of work of the Courts may not be very much greater than has been that of the Commission.

But the bigger issue seems to be the problem of the machinery and method for balancing almost imponderable considerations and arriving at a judgment of what constitutes the public interest and how on balance in a particular case it is affected. The President of the Board of Trade put the issue here with great clarity in opening the second-reading debate:

> "It is clearly not enough to record these various arrangements. It is necessary to provide for their examination and to determine whether they should be allowed to go on or whether they should be stopped. There is no solution to my knowledge in any country which precludes the need for some such decision to be made in any individual case.
>
> "The first question which has to be asked and answered is this: Who should determine the matter? There are only two choices—either an administrative tribunal answerable to a Minister or a court forming part of the judicial system of the country. There is no solution in between. It is not possible to imagine, or for the House to tolerate some administrative body deciding issues of this kind which has neither the status of the High Court determining an issue placed before it nor is responsible to a Minister answerable to Parliament. The choice is either the executive or the judiciary and there are forceful arguments for and against them both."

The President mustered—I hope I may be forgiven for saying it—the arguments against decision by a Minister, subject to Parliamentary debate, with great force. It was by implication rather than argument that one was left to suppose that the procedure of a Court must be better. This is where I myself am greatly looking forward to what Professor Montrose may have to say. Those of us who have been concerned by the trend of judgments on cases concerning the enforceability of contracts in restraint of trade may perhaps be unreasonably nervous as to whether a Court of Law is capable of the very difficult task of balancing conflicting elements in a complicated

economic situation and interpreting narrowly balanced economic arguments. Perhaps an economist may be wrong in seeing an undue tenderness for the more legal aspects of public interest—in particular, a tenderness for the sanctity of contracts whether desirable or undesirable. But I think we must wait to see how far Professor Montrose can satisfy some of us on that score.

There is one final point. I may have missed some relevant passages in Hansard, but I find it extraordinarily difficult to understand how the Court is to work. The Registrar, as I understand, will refer an agreement to the Court. The parties to the agreement will, no doubt, present through counsel their arguments as to how and why the agreement will work to the public interest—in terms of the recognised justifications included in Clause 16 of the Bill. Is the Court to exercise its own unaided judgment on the validity of these arguments? Is it for the Registrar to provide evidence to the contrary? Will the Registrar have a trained staff of economists and industrial experts as well as lawyers for this purpose? And if he does, will he not be duplicating the staff of the truncated Monopoly Commission, which in future is to withdraw from the field of restrictive practices and concern itself with other forms of monopoly? I see less difficulty myself in leaving the staff of the Monopoly Commission with some continuing responsibility here than others have done. I ask these questions because I believe that a great deal will turn on the success or failure of the Court in dealing wisely and impartially with some of the first cases that may be brought before it.

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HOW SHOULD WE CONTROL MONOPOLY?: II

PARLIAMENT is still in process of producing answers to certain issues of rule-making that are required if we are to be able to say "the keener the rivalry the better, so long as the competition is within the rules." But it seems reasonable to suppose that what will finally emerge will be something very similar to the present state of the bill. The answers which Parliament has given are roughly as follows:

(1) The only competent rule-making body should be the Government, and only in special cases should any group be permitted to frame rules of their own to regulate either their conduct or the eligibility of future competitors. The special circumstances for which provision is made in Clause 16 of the bill can be regarded as akin to the "advantage rule" which is found in a number of games. The Courts have power to suppress private rules.

(2) There is no need for the moment to promulgate rules additional to those which have been in force for some time, such as the Trade Marks Act, or to the common-law doctrine on "passing off" and similar issues.

(3) For the moment no new rule, governing the size or other qualifications of competitors, need be promulgated. This, however, is explicitly an interim decision. The Government, through the Monopolies Commission, is to consider whether disqualification of certain firms may from time to time prove necessary because of their large relative size, or alternatively, whether special rules of conduct may not have to be drawn up for such competitors, and the possibility of some new general rule at some later date is not excluded.

For present purposes I propose to take the decisions of Parliament as final and to consider the problems which arise in carrying them out. These problems arise for two sets of people; first, the Restrictive Practices Court, which has the duty of applying the "advantage" rule, and second, the reformed Monopolies Commission, which has the duty of investigating whether additional control is needed over the concentration of industry into large single units. I shall consider these two sets of people *seriatim*, since the special problems of the Monopoly Commissioners are simply additional to those which they share with the Restrictive Practices Court.

In operating the "advantage rule" the Court has the task of weighing the advantages claimed for particular restrictions under paragraphs (*a*) to (*g*) of Clause 16 against the damage to the public interest, which the Act presumes will in general follow from rules made by the players themselves. To weigh or to balance implies that the things compared have weights. Thus the Courts must be presumed to have some idea in advance not only

of the nature but also of the magnitude of the damage to the public interest which flows in the general case from restrictive practices. I have spoken of an idea of the magnitude deliberately, because I do not want to imply that the damage must necessarily be capable of being expressed in terms of precisely defined units of measurement. I mean that it should be measurable in the sense that we could say that a particular rule of cricket—say the rule against body-line bowling—has greatly improved the game; or, alternatively, that some modification of the rules has made very little difference one way or another to the game. We cannot say that the presence or absence of any particular rule has improved cricket by so many utils, but we can say whether the effect of the rule is big or small. In short, the Court will need to be able to assess both the nature and magnitude of the effects that are to be balanced.

The nature of the pleas in mitigation which a trade association may advance is set out explicitly in the Act (paragraphs (*a*) to (*g*) of Clause 16). The problem for the Court on this side of the balance is simply to assess the probability of the defendant's claim that such effects will follow if permitted. This will be difficult enough, but the greater difficulty is that there is no similar listing of either the nature or the magnitude of the effects which must be taken to have led Parliament to the general presumption that restrictive practices are normally against the public interest. Nor do I think that the Court will be able to form any clear idea of these effects from the various obvious sources which it may consult. This is not only true of the Parliamentary Debates, including the Government's statement of its motives in introducing legislation. More illumination is to be found in the reports of the Monopolies and Restrictive Practices Commission, but I think the Court will have difficulty in distilling any coherent body of doctrine from these, and I do not think they will derive great illumination from the technical writings of professional economists. In all these sources the doctrine is either too implicit or is presented in the form of a catalogue—frequently a hypothetical catalogue—without any significant attempt to sort out the relative weights of the different issues in the catalogue. I would like to make some suggestions as to the direction in which the Court will have to look to resolve these difficulties.

Let us first consider the public interest—a term which for obvious reasons is undefined in the legislation. It seems to me that the most natural definition of the public interest is what the public is interested in; and since the War the public has been primarily interested in two aspects of the functioning of the market economy. The first is the extent to which efficient and inefficient, low-cost and high-cost, firms co-exist in different industries. The second is the rate at which efficiency—now usually summarised as productivity—increases over time.

I suggest, therefore, that we should take the public interest to be the securing of the minimum intra-industry dispersion of efficiency which is compatible with economic progress.

If this is accepted, it follows that the onus which should be laid on the

defendant association is to show that its rules do not tend to increase the dispersion of costs or to slow up progress, whilst, on the other hand, the dangers under the heads recognised in Clause 16 with which they are designed to cope are very real. In other words, the general presumption of the Court should be that restrictive practices do tend to prevent the elimination of the unfit and to check progress. The responsibility for proving this presumption wrong in a particular case is on those who wish to be allowed to make private rules.

Now such a presumption can be regarded as reasonable only if it is possible to say in principle what sort of evidence would convince the Court that in a particular case the practices under consideration did not significantly prejudice the achievement of minimum dispersion or maximum progress. If this question cannot be answered, then the advantage rule is merely an empty form, and paragraphs (*a*) to (*g*) of Clause 16 are redundant. This reasonable demand can be met only if we—and the Courts—are prepared to make some assumptions as to the basic mechanism of a market economy. I suggest that three conditions must be satisfied if we are to have " reasonable " dispersion of efficiency and progress:

(1) Efficient firms must be able to grow at the expense of less efficient.

(2) The individual firm must be able to experiment with new techniques or products to a degree limited only by its own financial resources.

(3) There must be some, so to speak, grit in the system which prevents any advance of one firm from being immediately imitated with full effectiveness by all the other firms in the industry.

I offer these three considerations as the essence of what is really meant by a competitive economy, and the first two are the more important for our present purpose.

If you will accept these, it is possible to conceive of the sort of defence by which a trade association could convince the Court that its rules are not increasing dispersion or checking progress. The defence would be in two parts: first, a demonstration that the rules do not in principle act in this way—need not necessarily do so; second, empirical evidence that they have not in fact done so. What sort of empirical evidence can we conceive the firm as offering? On the first question, that of the freedom for the efficient to grow at the expense of the less efficient, the relevant evidence is, I think, that of changes over time in the relative sizes of firms. In other words, I would regard it as a necessary condition for the industry to be operating in the way which we agreed to regard as consistent with the public interest, that the relative sizes of firms should change over time, for it is contrary to the whole idea of progress that relative efficiencies should remain unchanged for any considerable period of time. Such evidence would, I think, need to be supplemented by evidence on the extent to which new firms have entered the industry over a period. For firms sometimes die, and it is necessary, therefore, if ultimate oligopoly is not to supervene, that new firms

should be born. Empirical evidence on the freedom of firms to experiment with new techniques and products would, I think, have to be in the form of a technical catalogue listing significant advances and attributing responsibility for them.

The Court's ability to appreciate and assess such evidence depends, of course, on the availability of a body of comparable data for other industries. This is a task to which economists might well address themselves, and indeed it is perhaps not too visionary to envisage that if the Courts follow the line which I have been suggesting, business firms will feel it to their own advantage to make facilities, and perhaps finance, available for economists to undertake such work.

The other side of the Court's task is to decide the probability to be attached to claims by trade associations that the issues listed under paragraphs (*a*) to (*g*) are in fact clear and pressing dangers. All I want to say on this is that I believe the Courts should make an assumption of continuing general full employment when assessing these probabilities. Most of the arguments which trade associations have so far advanced in defence of their rules rest essentially on appeals to historical experiences which may well be irrelevant in an age of full employment (the argument from excess capacity).

May I turn now to the problems of the Monopolies Commission? It follows from the way in which I have defined the public interest that I take a technological rather than a product definition of an industry, and it is in terms of such an industry that I would define monopoly. The typical monopoly situation which we have to envisage is, I think, one in which an industry so defined contains one very large firm and a fringe of smaller firms, and if monopoly is so defined the two criteria of the public interest which I have advanced still hold good.

The danger which we feel in monopoly cases is that mere size will remove from the monopolist (the large firm in the industry) his fear of loss, and leave other firms in the industry with the feeling that they exist on sufferance. If they feel so, their hope of gain is largely removed and their fear of loss is non-activating, since they can do little or nothing to guard against it. If this be so, the problem of monopoly arises not so much from what the monopolist does as from what he might do. The effects follow merely from his size, independently of his actions.

I see no solution, therefore, for this problem short of the forcible dissolution of large firms, and many of us will feel serious inhibitions against any such course of action. I need perhaps mention only two of these. In the first place we feel that in some very real sense a firm is a much more organic entity than is a trade association, and this is perhaps at the root of our instinctive disinclination to cut into it. This, as I have said, is largely a matter of instinct. The second reason is much more explicit. Full employment, efficiency and progress in this country rest on our ability to sell enough exports to keep us going, and our industries selling exports do so in competition with those of other countries where large firms (not always monopolists

in their own countries) are also common. If mere size does in fact give fighting power, then it is something which we want to preserve. All economic action involves risk; but the risk that forcible dissolution of large firms in the interest of restoring the market mechanism in this country will, in the short term at least, damage our export capacity is one which we cannot afford to take. We must therefore, I think, live in the hope that the battle abroad will substitute for the pressures at home which are loosed when we reach a monopoly situation.

J. DOWNIE

Oxford.

HOW SHOULD WE CONTROL MONOPOLY?: III

An academic lawyer honoured by a request to talk to economists cannot but recall some of the discussions of the general relations between law and economics. The words "law" and "economics" are, of course, ambiguous: to speak of but one aspect of their multivalence, both refer equally to the activities of men who form part of the social scene, legislators and judges, buyers and sellers, and also to the reflections of scholars—they refer to social processes and to academic disciplines. It was to social processes that Stammler referred when he said that law was the form, and economics the content, of social life. In saying that, he was proclaiming, so far as law was concerned, that law was totalitarian, that no aspect of social life was unregulated by law. To interpret his thought correctly it is necessary to unmask another of the ambiguities of the term "law." Even in juristic contexts it may refer to descriptive generalisations of human behaviour. In this sense to say that no aspect of social life is unregulated by law is merely to express a sociological heuristic hypothesis that inquiry will reveal patterns in all aspects of human behaviour. But Stammler's thought went further. His belief was that the whole of social life was subject to planned control: a *laissez-faire* ideology was a plan to leave some aspects of human behaviour to non-governmental controls. Justice, the ideal of law, embraced the whole of life, so that there was no logical inconsistency in the entire regulation of life by law; but justice did not ignore the need for free development of human personality.

Berolzheimer, also writing about the beginning of the century, saw law and economics as partners. He, however, was thinking of the academic disciplines: he regretted the rise of the newer social sciences which did not possess the precision of the older social sciences of law and economics, which between them covered the whole of society. I do not share these intellectual pretensions: certainly I am aware of much vagueness and inaccuracy in law. But the thought behind Berolzheimer's statement that lawyers and economists should know of each others' work seems to me important. The economist has expertise, but economic propositions can be expounded so as to be understood, and even criticised, by lawyers. There are no mathematical or medical, legal or economic mysteries: there are only difficulties—physical, emotional, intellectual. They exist, like Everest, in order to be overcome.

This introduction has led me to a problem which might perhaps have been better considered within a framework of an ordered statement of the various questions concerned with the legal control of monopolies. A general question is that of the qualifications of a lawyer-judge for participating in the administration of a scheme of control of business activities. Of course, business activities are already the subject of legal control through lawyer-

manned courts in many ways; but the belief seems to exist that at present such laws are of the type of primitive precepts prescribing penalties in detailed circumstances: " mathematical formulas whose essence is their form." The judge's functions with such rules are limited. He ascertains the truth about the " facts " alleged by the parties; then, as the Supreme Court has put it, he gathers the significance of the rules " by taking the words and a dictionary "; and, finally, he arrives at his decision by a quasi-logical process of seeing whether the facts come within the rules or not. His task is to see that the rules of evidence and procedure are observed in the ascertainment of the facts, and that the relevant substantive rules are properly applied. He has no part to play in the formulation of the rules, he has no discretion to exercise which may permit the intrusion of social, economic or political doctrines or of human prejudices. He represents impartial justice with a modern electrical device which deals with mathematical formulas. The question is whether a lawyer should be permitted to discharge other functions. The Restrictive Practices Court, for example, as envisaged in the present Bill, has to determine whether " having regard to the conditions actually obtaining . . . the removal of the restriction would be likely to have a serious and persistent adverse effect on the general level of unemployment in an area in which a substantial proportion of the industry to which the agreement relates is situated." It also has to determine whether " a restriction is not unreasonable having regard to the balance between those circumstances [such as the one just stated] and any detriment to the public . . . likely to result from the operation of the restriction." Such rules contain no " mathematical formulas," but involve nice considerations of economic theories and economic, and even political, predictions. Lawyers, say one group of critics, have not the ability to administer such rules: judges, say another group, yearning for some non-Aristotelian dehumanised " government of laws," should not pollute the pure fountains with such matters. Let me turn to American experience of legal control of monopolies in dealing with these matters.

In 1890 the Sherman Act prohibited in broad terms practices in restraint of trade and the monopolising of trade. The Act was to be enforced by the criminal procedure of the courts. It was left to the courts to work out the patterns of behaviour which they considered violations of the Act, and one notable construction was that of the application of the so-called " rule of reason." A mere restraint of trade was held not to be illegal: it had to be unreasonable having regard to the balance of the interest of the parties and the public. The Clayton Act and the Federal Trade Commission Act of 1914 prohibited unfair methods of competition and set up a Commission charged with the task of enforcing the Act, subject, however, like other administrative tribunals, to judicial review by the ordinary courts. Those Acts, and the later Robinson–Patman Act of 1936, did contain some specific provisions, such as a prohibition of price discrimination where the effect is substantially to lessen competition or to tend to create a monopoly, and the prohibition of payment of a commission or brokerage or allowance of a dis-

count " except for services rendered." It was, however, by means of its " interpretation " of the general prohibition of " unfair methods of competition " that the Supreme Court arrived at the ruling that a price-fixing agreement is illegal *per se*; and it was again the authority of the Supreme Court's approval, and not any specific provision of the legislation, which empowered the Commission to order a " combine " to divest itself of some of its units. In the *Sabine Chain Theatres* case, the Supreme Court, approving of an order for a company to sell fifty of its 148 cinemas (so that it owned no more than two cinemas in any town and only one in the smaller towns), said:

> " To require divestiture . . . is not to add to the penalties that Congress has provided in the anti-trust laws. Like restitution [a remedy developed by courts in civil cases, as where money has been paid by mistake] it merely deprives a defendant of the gains from his wrongful conduct. It is an equitable remedy designed in the public interest to undo what could have been prevented had the defendants not outdistanced the government in their unlawful project."

It is as a result of " interpretation " that the Supreme Court has hitherto held that " mere size is not an offence under the Sherman Act "—a holding which has been challenged in one powerful dissent—and has held that control of 98% of sugar refining and 90% of the production of shoe-making machinery were not unlawful monopolies.

The administration of the anti-trust laws has not escaped criticism. This is what one writer, a lawyer, has said:

> " Our courts were not trained with the complicated problems of anti-trust. . . . The administration of the rule of reason by our courts has proved a complete failure. The preservation of our economic order of free competition by the judicial process of exclusion and inclusion, casts a burden upon our judges which is basically at odds with, and plays havoc upon, their exclusively legal training and goes far beyond the traditional common-law litigation between private parties."

My researches, which confessedly are limited, have, however, disclosed no criticism of American anti-trust legislation based upon bringing the courts into disrepute by casting doubt on their impartiality. The Sherman Act has been said to do no more than " cast upon the courts its centuries-old common-law judicial function ": one line of criticism has been that the courts have adhered too closely to the common law. " At common law," says Callman, " the rule of reason involved a balancing of private interests between the parties to a contract in restraint of trade, and this concept was, without further refinement, incorporated into Section 1 of the Sherman Act which was enacted in the public interest." This, however, is a curious reading of the common law. The classic judgment is that of Lord Macnaughton in the *Maxim-Nordenfeldt* case; the well-known dictum is:

> " Restraints of trade may be justified . . . if the restriction is reasonable—reasonable, that is, in reference to the interests of the

> parties concerned and reasonable in reference to the interests of the public, so framed and so guarded as to afford adequate protection to the party in whose favour it is composed, while it is no way injurious to the public."

Not only do United States lawyers see in the administration of anti-trust laws by the courts the proper discharge of a judicial function, there are those who regard the participation by the courts in social issues as democratic procedure. This is what Douglas, J., has written of the Supreme Court:

> " The Court itself became part of the dynamic process of history. It did not live aloof from the turbulence of the times. It was part of the life of the community: absorbed from it the dominant attitudes and feelings of the day, and moved with the impetus of the era. . . . We too must be dynamic components of history if our institutions are to be vital directive forces in the life of our age."

But Douglas, J., was like Holmes, J., insistent that the judges should not read their own ideologies into law. " The problem of constitutional adjudication . . . is to keep the power of government unrestrained by the social or economic theories that one set of judges may entertain."

The contention that lawyer-courts have not the expertise to deal with economic issues has been largely accepted in the United States, and the rule of the ordinary courts restricted to review of the findings of administrative tribunals, which, however, do have lawyers among their personnel. Many hold that the findings of these tribunals should be accepted in all questions of fact. In the *Cement Institute* case the Supreme Court said that the Federal Trade Commission were the experts on the questions involved in anti-trust laws: " We are persuaded that the Commission's long and close examination of the questions it has decided has provided it with precisely the experience that fits it for performance of its statutory duty." But the policy of treating administrative tribunals in this fashion has been described recently as one of " judicial futility." Frankfurter, J., has said about the National Labor Relations Tribunal: " If I were a circuit judge I do not think I would be free to say this looks to me like another cock-and-bull story, but those fellows, Paul Herzog and the others, know human nature and I do not." The traditional dichotomy of leaving questions of fact to juries and commissions, and reserving questions of law to judges, has been subject to close scrutiny. The language of " fact " and " law " has long been regarded as ambiguous. Washed in logical acid, so-called " facts " dissolve often into processes of evaluation assuming inarticulate theories of many kinds. This is what the Supreme Court said two months ago about the most commonly employed concept of the common law to-day:

> " It must be borne in mind that negligence cannot be established by direct, precise evidence such as can be used to show that a piece of ground is or is not an acre. Surveyors can measure an acre. But measuring negligence is different. The definitions of negligence are not definitions at all, strictly speaking. . . . Issues of negligence call

for the exercise of common sense and sound judgment under the circumstances of particular cases."

The nature of the judicial process has been the subject of careful study in the United States. Douglas, J., going further than his great predecessor, Holmes, J., has said: "Precedents are made and unmade not on logic and history alone. The choices left by the generality of a constitution relate to policy." But it is not only constitutional provisions which contain those general propositions which, as Holmes, J., said, do not decide concrete cases. Legal provisions, whether established by the courts or by legislatures, often take the form of broad standards and wide principles. Their application often involves processes of evaluation and subordinate legislation, which are most wisely and efficiently carried out when the purpose of the law is fully realised. Two millennia ago Celsus said: "Scire leges non hoc est verba earum tenere sed vim ac potestatem." Lawyers ought to be acquainted with the policies of the laws; and when the laws are concerned with economic issues, it is vital for lawyers to appreciate the economic theories and policies.

The subject for discussion is that of the problems which arise when use is made of tribunals similar to those of courts of law for the control of monopolistic practices. The problems that I can discern appear to me to be these. What are the values which are sought to be attained by the governmental apparatus of the tribunals? What must be the character of rules designed for the maintenance of standards? What are the merits of flexibility and rigidity? Is a legal tribunal an efficient body for the ascertainment of facts relevant to the investigation of a charge of monopolising? To what extent may courts of law be expert in the application of the relevant rules to the facts, seeing that this must involve the evaluation of facts in the light of the economic policies controlling the rules? How far are normal legal remedies appropriate to the enforcement of machinery of economic regulation? Can courts develop or administer more appropriate remedies for the regulation of monopolies?

It is clear that the policies involved in the legal control of monopolies are not purely "economic." Bentham taught that every law was a necessary "evil," since it was an infringement of liberty: it might, nevertheless, be a good law, but to ascertain whether a law was so, the evil prevented by the enforcement of the law had to be weighed against the evil inherent in enforcement. We now consider that if a particular social good is to be attained by governmental control the calculation requisite is more complex. Direct government action may be more efficient in achieving a particular economic end than the use of machinery of general laws and their administration through legal tribunals. But practical economics is political economy. There are important social interests to be maintained through due process of law courts which have to be put in the balance against the interests involved in monopoly control. Unfortunately, the felicific calculus of the weighing of evils, or the balancing of interests, cannot be arithmetised. The process of judgment involved has yet to be fully investigated. I do not

propose to do more here than suggest that there exists that problem for investigation. What I do propose to consider, or rather to assert, is that the policies, other than those of the rule of law, involved in monopoly control are not solely economic. Justice raises its head in both of the ends which may be predicated for such control. Political justice is involved in the control of economic power, designed to keep it within the limits tolerable in a democracy. Economic justice, or to use an older term, the *justum pretium*, is involved in the control which seeks to preserve competition so as to ensure fair prices for consumers and producers.

The relation between economic power and political power is studied in many disciplines. A distinction between *imperium* and *dominium* has long been drawn in juristic science. Its validity has always been questioned. It was indeed Austin and not Marx who said there could only be rights against persons, not over things. When the Sherman Act was passed, it was thought that it was directed against industrial empires. At the beginning of the century, however, in a number of cases, of which the *United States Steel* case was one, the Supreme Court held that mere size unaccompanied by unfair practices was not an infringement of the legislation. But by 1948, the Supreme Court's view had changed. In the *Columbia Steel* case the Supreme Court authorised the further expansion of the United States Steel Corporation by the acquisition of Consolidated Steel. The 5/4 majority did take size into account, but said it had to be balanced against the need of the industry for expansion. The minority, however, restated the doctrine that the evil of monopoly may lie solely in size. At first, size is related by them to economic factors.

> " The Curse of Bigness shows how size can become a menace—both industrial and social. It can become an industrial menace because it creates gross inequalities against existing or potential competitors. It can be a social menace because of its control of prices. Control of prices in the steel industry is a powerful leverage on our economy. For the price of steel determines the price of hundreds of other articles. Our price level determines in large measure whether we have prosperity or depression—an economy of abundance or scarcity."

The social menace referred to is one which may be categorised as economic. The court, however, went on to say:

> " In final analysis, size in steel is the menace of the power of a handful of men over our economy. . . . All power tends to develop into a government in itself. Power that controls the economy should be in the hands of the elected representatives of the people, not in the hands of an industrial oligarchy. Industrial power should be decentralised. It should be scattered into many hands so that the fortunes of the people will not be dependent on the whim or caprice, the political prejudices, the emotional stability of a few self-appointed men. The fact that they are not vicious men but respectable and social minded is irrelevant."

Nor does this opinion take direct note of the power that the directors of a big combine have more directly over the employees. The right to dismiss

workers moves from a private-law question of economic relations into the public-law problem of population mobility when the numbers involved pass into the thousands and tens of thousands.

The policy of monopoly control in the interest of fair prices is that of ensuring a " natural " control of prices as opposed to governmental price fixing. It is assumed that competition with other buyers and sellers in a market will ensure a just price. These " natural " forces may, however, eliminate competition: competitors do not compete in order to preserve competition. Undercutting is competition; but it may eliminate competition. It has been suggested that since the policy of the control of monopolies is the national interest in fair prices and productive efficiency, controls could be more direct. Instead of relying on fair competition to ensure the national interest, it is sufficient to keep a check on the economic units. Schemes involving such criteria would require different administrative practices than those seeking to control monopolies solely through maintenance of competition. The economist is perhaps the expert in weighing the merits of supervising machinery against suppression of restrictive practices, but can he assess the result of allowing economic power to pass into the sphere of political influence?

I am aware of the inadequacies of my consideration of the policies of monopoly control. I think, however, it is necessary for academic and practical lawyers to consider such policies if they are properly to understand or practise the relevant laws. I do not think it is possible to frame rules, which can be applied in some quasi-logical fashion, without consideration of policies. I wish, however, in this respect to deal with a single topic. The Dean of the Harvard School of Public Administration, reviewing United States case law, has said that the judges have thought in terms of restrictive practices, while economists concerned with the problem of trusts have thought in terms of the control of markets. The reason for this is, he thinks, that lawyers were concerned with tests that would stand up in a court of law, and that it is easier to draft workable rules prohibiting particular types of restrictive practices than to produce tests of a substantial degree of market control. I cannot accept this thesis. Restrictive practices are the means by which control of markets is obtained. What we have is not a conflict between lawyers and economists, but between hornbook rules and principles. It is an age-old conflict within the law, appearing in all its branches, between certainty and discretion. A series of rigid formulæ prohibiting particular practices may result in practices productive of market control escaping because they offend no formula, while others in fact innocent of market control are condemned. A rule embodying a flexible concept, on the other hand, may make difficult the task of prediction of judicial action, since it permits of a range of decisions. But this is no peculiarity of monopoly control law. In fact, the Sherman Act and the Clayton Act contain the wide terms of restraint of trade, monopolies and unfair competition. The " culture of two thousand years " has been said to lie between formalistic precepts and liberal rules.

Studies in the evaluation of various methods of ascertaining facts are comparatively rare. Such a study must begin with the need for distinguishing among the various classes of so-called "facts": and with the need for realising that the law of England, quite apart from other legal systems, knows more than one method. It must not be assumed that the procedure at a jury criminal trial with its elaborate rules of evidence is the only legal procedure. For the Nuremberg trials the Charter provided, more in accordance with Continental ideas, that the only compulsory rule of evidence was the rejection of irrelevant matters. The Supreme Court said in the *Cement Institute* case: "Administrative agencies, like the Federal Trade Commission, have never been restricted by the rigid rules of evidence. And, of course, certain rules which bar certain types of evidence in criminal or quasi-criminal proceedings are not controlling in proceedings like these." But, on the other hand, it must not be assumed that the various English rules of evidence are without value. The problem of what rules of evidence should be adopted by a Restrictive Practices Court remains a problem.

One of the problems is the treatment of the evidence of economists. How far should hearsay evidence be admitted about the general conditions of an industry? What about the opinions of economists as to probable causes and effects, and about trends and goals? What should a court do when economists conflict? Should a court which contains experts as assessors, such as an admiralty court, receive the evidence of expert witnesses at all, and should it accept the assessor's evaluation of expert evidence?

Another problem of the ascertainment of facts lies in its bulk. The investigation in the *Cement Institute* case compares with the Nuremberg trial. It took three years for the trial examiner to hear the evidence, which consisted of 49,000 pages of oral testimony and 50,000 pages of exhibits. It has been said that the collection and digestion of evidence is *the* problem in anti-trust cases. It has been argued that economists alone have the expertise to distil the essential features from the facts and to make their implications clear. Is it, however, unreasonable to believe that lawyers have also from time to time shown some competence in the handling of unwieldy masses of complex facts?

The ambiguity of "facts" means that the problem of their evaluation overlaps with consideration of the role of the expert witness. The crux of the problem of control through courts may lie in this question. Scientific evidence often comes before the courts: judges do not presume "to lay down the law" about "geography and geology and physics and engineering." Analysis of judicial reasoning has led jurists to assert that its inarticulate premisses contain propositions within the realm of psychology and economics, politics and sociology. What are judges expert about? Here is Professor Davies' view of American judges: "Courts are masters of common law, constitutional law, ethical questions, *a priori* reasoning, traditions and philosophies of law and government, the meaning of non-technical words and explanation and interpretation of legislative history." What a lot of fun may be had in arguing for the abbreviation or the extension of this list.

There remains the question of the nature and efficacy of remedies operable through courts for the control of monopolies. I know I shall be forgiven if I confine myself to one observation. The dominant function of law is widely considered as an aspect of social control of human behaviour. It is prospective behaviour which is in mind. Courts collect past debts as part of a process of educating people in promise keeping. So, too, the principal object of monopoly-control legislation may be stated in language used in the *Cement Institute* case as " not to punish or fasten liability on violators for past conduct but to ban specific practices for the future." But the ordinary courts of law rely to a large extent for this purpose on the deterrent effect of a court order, and the interest of parties to litigation in bringing the violation of a court order before the court. Injunctions are often not granted where constant supervision of a defendant would be required, on the ground that courts have no machinery of supervision. The administration of law is more efficient when policing exists in support of court decisions.

One of the great advantages of the institution of the Federal Trade Commission is that it has the machinery for supervising the enforcement of its orders and for ensuring that practices accord with those orders. Another great advantage is that it has officers who can investigate criminal practices and bring appropriate cases before the courts. The experience of the nineteenth century in England testifies to the value of inspectorates if legislation is to be really effective. The absence of a " commercial police " is one of the reasons why many of the provisions of commercial legislation remain a dead letter. A conclusion from this discussion is that the Restrictive Trade Practices legislation is more likely to be effective if the Registrar of the court is assured of the services of inquirers who are able, for example, to provide him with the " reasonable cause to believe " required by Clause 11 of the existence of unregistered restrictive practices.

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THE MONOPOLIES COMMISSION AND PRICE FIXING

THE Monopolies Commission has concluded satisfactorily that phase of its investigation concerned with "restrictive entry" practices.[1] In its first general report, *Collective Discrimination*, adverse conclusions on the public interest of these practices were reached, and it recommended general prohibition of them.[2] A second general report on the practices of "common prices and agreed tendering" was referred to the Commission in October 1955. Unfortunately, this reference will now be cancelled, since these practices will, with the passing of legislation in 1956, come within the jurisdiction of the new Restrictive Practices Court. However, the Commission, in its various industrial reports, has dealt with a sufficient number of industry reports to make it worth while examining its experience.[3]

I

It is important to place price-fixing practices in relation to the other main group, the restrictive-entry practices. In the majority of cases examined by the Commission the two are entangled in one comprehensive system of restriction. The question which naturally arises is whether restrictive-entry practices are designed to support a price-fix, or is the price-fix an outcome of restricted entry. One commentator comes down firmly in favour of one view and says it was a mistake to have the first general report on agreements to enforce conditions of sale.[4] And he argues that the principle of whether "firms should agree upon common prices, output quotas, or the allocation of markets—the basic instruments of monopoly control" should first have been decided. The Board of Trade reference on common price arrangements, he maintains, should have preceded that of the *Collective Discrimination* report.

This view stresses the orthodox text-book approach, which sees the monopolist as mainly a price adjuster and output fixer. Close study of the Commission's reports suggests something different. Typically, firms appear to enter trade-association agreements to *protect* themselves. They are not concerned to choose the most advantageous point on their collective demand

[1] Broadly, exclusive dealing, collective boycotts, loyalty rebates and the enforcement of resale price maintenance. See A. Hunter, "The Monopolies Commission and Economic Welfare," *Manchester School*, January 1955, for an analysis of this phase of the Commission's activities; also R. L. Cohen, ECONOMIC JOURNAL, March 1953 (Mem. on Reports).

[2] Cmd. 9504, 1955. A general report makes a survey of the effect on the whole of industry of a specified set of practices; its approach is based on the experience of a number of industry reports. See A. Hunter, "The Progress of Monopoly Legislation in Britain," *Scottish Journal of Political Economy*, October 1955, for an estimate of the significance of the general report.

[3] There are four mainly price-fixing reports (*London Building*, *Copper Semi-Manufactures*, *Pneumatic Tyres* and *Sand and Gravel in Central Scotland*) and six others in which price fixing is involved with other practices.

[4] John Jewkes, "The Control of Industrial Monopoly," *Three Banks Review*, December 1955.

curve (although this conceivably can happen) so much as to keep the competitive spirit within bounds. That is, agreements seem designed to keep out, or keep under control, new firms, new products or services, new methods of production, etc. If this is the correct interpretation the price-fix appears as a subsidiary element of restrictive systems. True, it provides a higher and more stable income than would be the case with unrestricted competition; this is what one expects of a system of protection. But few reports of the Commission show that restrictive agreements support high profits; the aim of associations seems to be the earning of " reasonable " profits. And a more common result is the retention of excess capacity, keeping prices higher than necessary.[1] Then price fixing itself can frequently be seen as a mainly protective device to keep in existence the less efficient producers; it is a reflection of a " live and let live " spirit in the industry.[2] Certainly resale price maintenance has been enforced by distributors' associations [3] precisely because it prevents the entry of new methods (*e.g.*, self-service) which depend on price competition to become established.[4]

Hence it is difficult to maintain that the practitioners of restrictive agreements have the same rationale as text-book monopolists. The details of such agreements fall into perspective more readily if one regards them as instruments to avoid the severities of competition; " the best of all monopoly profits is a quiet life." [5] This means that the key practices in agreements concern *exclusion and enforcement*, not price fixing. It is significant, for instance, that the Commission has recommended that price-fixing arrangements be permitted to continue in three of its reports; whereas it has never contemplated allowing any of the restrictive-entry practices to persist. That is, the Commission appears to find that the forms of competition which make for change and flexibility, for a faster rate of economic progress,[6] are more fundamental than price competition. Indeed, price competition in some cases may be largely irrelevant.[7]

The administrator of monopoly legislation is less troubled by these theoretical points, but he comes to the same conclusion. What he sees is a

[1] E.g., *Dental Goods*, *Rainwater Goods*, *Calico Printing* and *Imported Timber*.

[2] E.g., *Copper Semi-Manufactures* and *Sand and Gravel in Central Scotland*.

[3] *Collective Discrimination*, paras. 169–71, and B. Yamey, *The Economics of Resale Price Maintenance*, Ch. IV.

[4] The methods by which trade associations fix prices confirm these views. Where they are known, an average is normally taken of members' (average unit) costs. It may be a simple average, the average of the three or four lowest-cost producers, a weighted average or even " the lowest basis of prices submitted " (*e.g.*, see below, pp. 590 and 594). Alternatively, members find a mutually satisfactory price in committee; occasionally this is a " compromise price [or increase] having in mind what the market will bear "; or, more simply, prices are the result of a percentage addition to price lists drawn up many years before, usually without the benefit of cost reviews. In a fully employed economy these price-fixes are rarely accompanied by deliberate restriction of the industry's output, and market sharing occurs in only a few cases. Whatever else, they are not methods which suggest a picture of entrepreneurs seeking to maximise joint profits. (Cf. T. Scitovsky, *Welfare and Competition*, pp. 378–84.)

[5] Cf. J. R. Hicks, " Annual Survey of Economic Theory: The Theory of Monopoly," *Econometrica*, January 1935, p. 8.

[6] Cf. Hunter, *op. cit.*, *Manchester School*, pp. 25–39.

[7] See below, p. 600.

complex of restrictive-entry practices and price fixing, with perhaps a market-sharing arrangement thrown in. His aim is to select for prior attention the strategic elements necessary to hold such a system together. It is not surprising that the Board of Trade first selected, as the " basic instruments of monopoly control," those practices, such as exclusive dealing, collective boycotts, aggregated rebates, etc., which *enforce* the system on both members and independents.

This is not to say that price fixing cannot be operated without the support of other practices. Common prices can be maintained with relatively little support where there is sufficient agreement within the industry. This occurs, for instance, if there are few manufacturers, where a relatively small territorial area is affected, if the association has a strongly organised central invoicing system or where it has retained a pricing procedure dating from inter-war recession years.[1] Two reports in particular are primarily price-fixing reports. Using them it is possible to isolate and assess, as the Commission sees them, the effects of this practice. The first, to be dealt with in Part II, concerns a " competitive " (*i.e.*, non-monopolistic or oligopolistic) type of industrial structure. The second, in Part III, is a case of oligopolistic price fixing.[2]

II

There are 140 firms in the Copper Semi-Manufactures (or Non-Ferrous Metals) industry, which produces to the value of £175 million per annum mainly for other industries. Imperial Chemical Industries (Metals Division) is the largest single producer, and makes almost every product of the industry. The next biggest is British Insulated Callenders' Cables Ltd. and its associated firms, also with a comprehensive range of products. There are other fairly large firms which are specialists—Delta Metal Company (for extrusion), M'Kechnie Bros. (extrusion), Enfield Rolling Mills (specialists in rolling) and London Electric Wire and Smiths Ltd. (wire drawing). These six are the giants of the industry, but no firm accounts for one-third of the industry's output, and therefore cannot qualify as a potential monopolist in its own right. The remaining firms are small and are inclined to specialise for the electrical and radio industry, for engineering, the motor industry, etc. The mild degree of concentration is typical of the engineering trades.[3] Of these 140 firms, seventy belong to one, or more than one, of twelve trade associations. The associations are organised according to the main products—the Tube Association, the Brass Wire Association, etc.—to regulate the trading practices of their members. In the aggregate the associations cover (by weight) 76% of the total production of the industry. Ten of the associations are members of the British Non-Ferrous Metals Federation, which is a co-ordinator of their activities and formulates such practices as " Standard Con-

[1] As in respectively *Pneumatic Tyres, London Building, Sand and Gravel in Central Scotland* and *Copper Semi-Manufactures*.

[2] The *Supply and Export of Certain Semi-Manufactures of Copper and Copper Based Alloys* (H.M.S.O., July 1955) and *The Supply and Export of Pneumatic Tyres* (H.M.S.O., December 1955).

[3] H. Leak and A. Maizels, " The Structure of British Industry," *Journal of The Royal Statistical Society*, 1945, Parts I–II, Appendix III.

ditions of Sale," a " Common Price Policy " and standard " Discounts and Rebates," as well as operating research and development schemes, a statistics service, etc.

The main restrictive practice of the industry, the Commission found, was that of fixing common minimum prices. It is the focal point of the associations' activities and is long-established, dating in most cases from the 1920s or even the late nineteenth century. The cost of the virgin metal may account for anything between 60 and 90% of the price of the product. The associations then add the conversion (manufacturing) costs, found, in most cases, by taking an average of costs submitted by members. Some are simple averages. Others adjust in various ways to eliminate individual costs which are thought to be too high or too low. For instance, the Cold Rolled Association eliminates the two highest and the two lowest, and averages the remainder. And the High Conductivity Association has a formula weighted to favour low-cost and large-output producers. Some associations are less " scientific " in their methods of finding a price, and simply add a margin to the cost of buying intermediate products from other associations; or they argue it out in committee.[1] Most other practices are found to be " incidents of the common minimum price system " [2] (collaborating on tenders, arranging the price of scrap from customers, standard discounts, etc.) and not very important especially in view of the subsequent recommendation of the Commission to abolish price fixing.

There is usually a " judicial hearing " at an advanced stage of the Commission's investigations; in this the British Non-Ferrous Metals Federation defended the price system on grounds made familiar in earlier reports. The main defence was that price collaboration was required to offset the industry's vulnerability to fluctuations of " prosperity, booms and slumps." In recession there is a strong " pressure to reduce prices below the economic level." This point is connected with the quality of the product. With 60–90% of the price in the raw material, the main burden of price-cutting falls on conversion costs. Consequently, there is a strong temptation to lower the quality of the product; a most undesirable development in an industry in which standards and specifications are so vital to the buyers. In any case, the Federation claims, competition is directed away from price " into more fruitful channels " and " provides a constant economic pressure to improve the product." It is stressed that research and development " thrive best in an industry which is stable and which encourages the investment of capital in new methods of production." And the Federation instances some

[1] In masterly understatement the Commission comments on " certain defects " in the system of costing employed within the associations. Less than half the members made returns (the smaller firms did not trouble); only the popular sizes were costed, and those which attracted small and medium-sized orders were neglected; the partial use of scrap metal in some cases was ignored; and prices were in many cases related to cost reviews carried out immediately after the War, and subsequently not altered in the light of later reviews.

[2] Except the practice of awarding loyalty and aggregated rebates, which falls into the restrictive-entry category. On these the Commission took the same line as in its general report; that such rebates " impede access to the market by independent producers because they provide a form of pecuniary pressure on buyers to confine their purchases to members of the association " (para. 319).

of the achievements of its research and development association and claims an "outstanding record in the development of technical improvements."

Besides these familiar points, two unusual defences were made by the Federation. First, it was maintained strongly that one factor which influenced the development of price fixing had been the need to protect the industry against the "power of the buyers and their potential ability to compete." The industry "serves other manufacturers and traders who know their jobs and have every reason to seek economies and to assess the value to them of all the alternative sources of supply of material and services. There are often powerful buying units, and others group together into powerful organisations which negotiate terms collectively." If true, this argument constitutes a considerable tribute to the influence of "countervailing power" in markets for semi-manufactured products.[1] Secondly, the Federation claimed that in the absence of price arrangements there would be a development of "concerns operating in specialised groups of products" and "achieving a real degree of monopoly power." Hence the theoretical advantages of low-cost production "would be offset in practice by the absence of competition." The existing arrangements gave "a very satisfactory balance between specialisation and diversity of production." These two arguments made an ingenious attempt to hoist the Commission with its own petard.

The Commission showed considerable skill in sorting out the complicated issues of the case, and deftly turned a number of the Federation's points to its own advantage. For instance, it pointed out that although the quality of the product is of the greatest importance to the customers of the industry, these same customers, by the Federation's own showing, are technically and commercially as well qualified as the suppliers and well able to protect their own interests. Hence it is not likely that price competition would be permitted to lower quality standards. The Commission also quickly disposed of the argument that greater specialisation in the industry would help establish monopoly positions. It reviewed the advantages of specialisation: the need for continuous operation of the more modern types of hot-working plant was emphasised; it was pointed out that the economies of large-scale production in the industry had already placed pressure on certain branches to amalgamate; and the view of the Anglo-American Productivity Report was cited that "the use of the most modern plant requires some rationalisation of production between manufacturers." The possible disadvantages are discounted, although clearly given serious consideration. It seemed to the Commission that the resources of other manufacturers in the industry and of the industry's customers are such that in the event of monopolistic abuses there would be every prospect of competition being re-established.

The Commission's main concern, however, was with the role of price competition in the industry.[2] The very considerable spread of costs found

[1] J. K. Galbraith, *American Capitalism*. The Commission is open to conviction on this point (cf. Hunter, *op. cit.*, *Manchester School*, pp. 31–4), but in this case the industry's claim was not sustained (see below). [2] Paras. 285–91 and 304–10 especially.

in the industry was brought out; [1] and the difficulties which the associations experienced in finding an average price for their products was stressed. The spread of costs varied not only according to the size and type of plant but also with the type, and variations, of product and, markedly, with the size of the order. The Federation stated, for instance, that "large producers capable of making cheaply fifty tons of a size and gauge are high cost producers when they have to manufacture small lots specially, whereas the small producers may be able to make small lots cheaply." Price fixing has two consequences in these circumstances. The price of each product is related to the average for all producers and not to the costs of the manufacturer who can produce it most cheaply; it is therefore priced higher than it need be. And, secondly, the common minimum price prevents the most economical producer from using price decreases to attract to himself a sufficient volume of those products which he can manufacture economically. He is compelled to cover his overheads by taking orders for products which others could produce more cheaply. On the other hand, if the price lists reflected the economies of specialisation—or better still if there were no price lists and therefore price competition—each firm would be compelled to concentrate on the type of work and size of order which it could execute most economically. This increase in efficiency would apply to all sizes of firm (though it seems the Commission had in mind mainly the larger and more integrated production units). In addition, with price competition there would be a greater incentive to reduce costs. The Commission concluded that there would be a better allocation of resources within the industry, giving lower costs and a lower general level of price, if firms were free to compete in price with one another.[2]

The wide spread of profit earnings [3] confirmed the Commission in its

[1] For instance:

Product.	Lowest cost per ton.	Highest cost per ton.
Copper wire, 30 s.w.g.	£32	£53
Brass strip, 24 s.w.g.	£45	£135
Copper strip, 24 s.w.g.	£45	£85
Building service tubes, 1 in.	£72	£112
General copper tubes, ¼ in.	£139	£226
Brass wire, 10 s.w.g.	£57	£101

[2] Besides establishing the case for price competition, the Commission dealt with a second line of defence which maintained that there was effective competition in other forms—*e.g.*, in quality and service among members, in price competition from independents and potential competition from customers and alternative materials. The evidence of internal competition the Commission found unconvincing; it appeared that aggressive independents were usually brought into line by the threat of indefinite price war; and potential competition did not operate rapidly or very powerfully. When competition from independents or customers appeared dangerous the arrangements were sufficiently flexible to make concessions and thus preserve the main structure of price fixing.

[3] *Profit as a % of Capital Employed in the Industry*

	1937.	1949.		1952.		1953.	
		Or. Cost.	Rpl. Cost.	Or. Cost.	Rpl. Cost.	Or. Cost.	Rpl. Cost.
Lowest	−1·3	8·6	3·4	9·3	6·5	−3·2	−4·5
Highest	30·4	60·1	40·9	81·2	61·0	69·7	51·3

Apart from the spread, profits in the industry were "generally reasonable" and "the average for the industry as a whole has not been high" (para. 360).

reasoning. It was carefully stated that " high profits in themselves are not against the public interest provided they are earned in open competition as the reward for efficiency." But their existence in a trade which operated " a comprehensive system of minimum price fixing that practically excludes competition in price . . . inevitably suggests that prices are unnecessarily high."

The Commission's analysis of the merits of price competition in this industry appears to conform with accepted thinking on such matters. One possible objection, or omission, concerns the treatment of fluctuations. Prices are governed to a large extent by the price of the virgin copper, which is not exactly stable.[1] Also, it is a well-known thesis that price-fixing systems are an effective restraint on deflationary and inflationary pressures.[2] The Commission expressedly appreciates these points, particularly that common prices " may alleviate the worst consequences [of a slump] both for capital and labour." It could be argued from this that the influence of fluctuations on this industry should constitute a major aspect of the Commission's analysis, perhaps affecting the whole trend of its decision. Certainly the British Non-Ferrous Metals Federation appeared to think so; and most trade associations submitting cases to the Monopolies Commission have emphasised the vicissitudes of industrial fluctuations. However, the Commission invariably refuses to make concessions on this issue. In this report the case for stabilising prices is made and commented upon in one brief paragraph. Against the advantages of price fixing as a stabiliser the Commission is content to say that " there has been a marked change from the restrictionist attitudes of the 1930s " and " that it is the duty of the government of the day to take positive action whenever necessary to maintain a high and stable level of employment." [3] The first part of this comment exaggerates; many of the Commission's own reports testify that restrictionist attitudes are remarkably persistent. Presumably what is meant is that there *should* be a change in attitude for the reason given in the second part of the comment. On the fluctuations issue the Commission, understandably, avoids analysis and confines itself to a statement of the prevailing official optimism.

The treatment of price fixing in this report is consistent with views expressed in other reports.[4] The tentative conclusion can be drawn that it

[1] In fact, the price-fixing system was used to absorb fluctuation in the price of copper only to a minor extent. Government control of metal prices ended in 1953, and since then " some " firms have adjusted their holdings of stock in anticipation of prices. Also a few associations do not alter their fixed prices except for a minimum shift in the price of copper. But the majority of association prices alter in line with the current prices for copper quoted on the London Metal Exchange (paras. 226–7).

[2] K. Boulding, " In Defense of Monopoly," *Quarterly Journal of Economics*, August 1945, pp. 524–42, and J. R. Hicks, *Value and Capital* (1939), p. 267.

[3] Para. 287. In the Calico Printing industry, where there is admittedly a prospect of declining trade and increasing unemployment, the Commission is more explicit. It takes the position that price-fixing schemes would be " at the expense of other sections of the textile industry and of the wider public interest "; and advises that such arrangements will " only create a false sense of security for a time and delay the adjustments and redeployments of resources which will have to be made " (para. 210).

[4] In *Dental Goods* (paras. 229–30), *Rainwater Goods* (paras. 219–20), *Calico Printing* (paras. 192–211) and *Sand and Gravel in Central Scotland* (paras. 286–303).

represents the definitive attitude of the Commission for the "competitive" type of industrial structure.[1]

III

The output of the Tyre industry is about £100 million per annum (8% of which is the value of remould tyres). Between 30 and 40% of tyres are for the *replacement* market and *mileage contracts*; about 33% are for the *original-equipment* market (fitted to new vehicles); and between 25 and 33% go to export markets. Eleven manufacturers produce new tyres, and they are all members of the Tyre Manufacturers' Conference (T.M.C.) In terms of effective market power the number is even smaller. The Dunlop Group (Dunlop and India Tyre Company) produces about 50% of the total output. The next four largest manufacturers between them produce another 40%. This leaves only 10% between the remaining six small manufacturers. Of the four largest other than Dunlop three are subsidiaries of foreign companies; these are Michelin (France) and Firestone and Goodyear (U.S.A.). The other large firm, British Avon Tyre Company, has technical and market agreements with a further American firm.[2]

All members of the T.M.C. maintain identical retail prices for new tyres in the *replacement* market. For each group of products (Car, Giant, Aircraft, etc.) costs are submitted to an accounting firm. From these figures this firm calculates future costs for the industry and submits averages (weighted by the turnover of individual companies) to a representative T.M.C. Accountants' Panel. Further consideration is given to other influential factors, such as wages, and eventually recommendations are made to the appropriate Conference Groups, which finally decide the price for each class of product. These identical prices are further protected by: (1) agreed scales of discount to large users; (2) inspection panels to examine complaints about Giant and Agricultural tyres—substitution of damaged tyres can be a concealed form of price cutting; (3) an agreement not to make private brand or unbranded tyres; and (4) the branding of sub-standard tyres to ensure they are priced as remoulds, and therefore will not compete with first-line tyres.

In the other domestic markets the restrictions are of minor importance. In *mileage contracts* a common formula (to recover the retail price of the service tyre) is used. But the restrictive element here is the "natural result of the system of identical prices" rather than a policy of level tendering. In any case the bargaining strength of the transport undertakings appears to ensure reasonable prices; profits in this market are low or negative. Of

[1] The conclusions in the "agreed tendering" report are similar. It was stated that customers should not be prevented from choosing between grades of quality and service in a contractor; and that the selection of small groups of specially qualified builders for certain types of contract should properly be the function of the professional architect and not be undertaken by a private, interested organisation such as a builders' conference. The communication of tenders between competitors, to fix a price, frustrated the selection of competitive efficiency and kept prices higher than was necessary (*London Building*, paras. 214–34).

[2] There are altogether six foreign subsidiaries. They conduct themselves independently, but normally receive technical advice or direction from the parent company and agree to avoid its export markets.

original-equipment tyres, 95% are sold to customers on a "no restriction" register; that is, the price is an individual one. In practice, the vehicle manufacturers seem able to impose *their* common prices on the tyre industry. Profits in this market are not high. In the other original-equipment registers Dunlop sets the basic prices (followed by the others), and discounts are prescribed by the T.M.C.[1]

In the *export* market Dunlop has an informal arrangement with the principal American and Continental manufacturers for setting international prices; the "ceiling is usually the domestic price level in United Kingdom or the U.S.A. whichever happens at the time to be the lower." Dunlop informs the other British manufacturers of the decision reached, and they usually (not always) follow suit in export prices.

The enforcement of T.M.C. prices in the distribution of new replacement tyres is not undertaken by the Conference itself. In 1946 this task was handed to the British Motor Trade Association (B.M.T.A.). This association, set up originally on the initiative of the Society of Motor Manufacturers and Traders, is an unusual body. It undertakes to enforce prices in any branch of the motor industry—electrical accessories, sparking-plugs, etc.—and 17,000 manufacturers are members for this purpose. In the tyre industry it enforces the retail prices on all retailers on the Tyre Trade Register. To receive supplies at all a distributor must be on this register. The main method of the B.M.T.A. is to make test purchases from dealers suspected of price cutting. Where a good *prima facie* case is established the offender is invited to appear before a Price Protection Committee—in essentials an informal court or domestic tribunal where cases are conducted by counsel and presided over by retired colonial judges. Offenders may be warned, fined up to £100 or, in serious cases, placed on the Association's Stop List. The B.M.T.A. protects this anomalous position by the statement that its machinery cannot be used to enforce "ring" prices; and it demands an annual certificate from members to the effect that they are not parties to the fixing of common prices. It is therefore, on the face of it, concerned with *individual*, and not collective, price enforcement. But to quote the report "from the point of view of the consumer" there is little difference "between the practical effect of the T.M.C.'s arrangements and the situation which would result if an undertaking to fix common prices existed."

The tyre manufacturers repudiate the idea that prices are fixed in the industry. They contend that uniformity of prices is brought about by

[1] The *retread* industry is important: in 1954 the number of remoulds sold was 40% of new replacement tyres. T.M.C. members account for only 27% of this output; they were slow to appreciate the potentialities of this market, and a considerable retread industry developed independently. The Retread Manufacturers Association (R.M.A.) has eighty-five members. It recommends, but does not enforce, prices in line with those of T.M.C. remoulds. In practice, R.M.A. prices are rather lower than T.M.C. prices, and the smaller retreaders provide some price competition. The retread material is mainly supplied by T.M.C. members at identical prices. There is no restriction on the supply, and the quality is satisfactory. The Commission did not find the arrangements in the retread industry to be against the public interest, since T.M.C. remould prices are "subject to any competition that might be exerted by R.M.A. members" and R.M.A. prices are not enforced.

" competition which forces others to follow the price leader; . . . one manufacturer indicates a price and his competitors are compelled to follow suit because they would lose their customers if they charged more and because if they charged less, their tyres would be thought inferior." [1] In addition, the system has the advantage that it restrains price changes in an upward direction: " One or more manufacturers may be able to force prices down while virtual unanimity is required before prices can be increased." [1] This " competitive leadership system " is represented as a useful compromise between two extremes. On the one hand, there could be " full-blooded " (cut-throat) competition which would eliminate manufacturers and leave the survivors in such a state of exhaustion that prices would be raised to recoup losses. The consumer would suffer eventually and the industry would be concentrated in fewer hands. On the other hand, there could be arrangements to eliminate competition altogether and a monopolistic situation would be created.

Resale price maintenance is justified separately by the T.M.C. First, it stabilises the industry. Tyres could be a speculative product because, while the total consumption is not much affected by price, the raw-material prices do fluctuate widely. Secondly, it ensures that " essential " technical services are provided by the distributive trade. If prices are not maintained price cutting would lead to smaller receipts, and in turn put pressure on distributors to scamp fitting and other technical services. In evidence, Dunlop makes the arbitrary statement: " The only way to make buyers use this service is to make them pay for it in the expectation that, having paid for it, they will use it." Also, collective enforcement of resale price maintenance through the B.M.T.A. procedure is more effective than individual enforcement; the ordinary courts are slow, cumbersome and expensive.

The Commission quickly disposes of the argument that the T.M.C. system is not a price-fixing organisation. It accepts the statement that there exists no actual agreement binding manufacturers to charge identical prices and that companies are free at any time to charge individually fixed prices. At the same time the Commission points out that Section 3 (2) of the 1948 Act makes it possible to interpret conditions restrictive of competition when manufacturers conduct their businesses so as to restrict competition whether they do so " voluntarily or not and whether by agreement or arrangement or not." The Commission then goes on to show that: (*a*) all changes in the prices of replacement tyres are discussed by T.M.C. members; (*b*) all manufacturers since 1946 have taken identical action following these discussions; (*c*) the procedure of the Conference admittedly provides for

[1] Paras. 450–2. Strictly speaking the two quotations represent two different types of oligopoly and contradict one another. The first is a " price leadership " situation, where all must follow the more powerful leader. The second is a case of the " kinked demand curve," in which all producers are roughly equal in market power and one or more manufacturers can force the price down (although they normally choose not to) but unanimity is required for a price rise.

exchange of information on costs and permits each manufacturer to form a shrewd idea of his competitors' trade position and therefore his intentions; and (*d*) until the 1948 Act was passed the price-making decision of the Conference was actually registered as a collective decision and not, as now, a set of individual decisions on prices. The conclusion is that the T.M.C. members " find it expedient to follow the policy of keeping their prices the same; and in these circumstances—price competition is in fact restricted, although the policy is not embodied in an agreement and no manufacturer is bound to continue to adhere to it." [1]

It was decided that the Conference system operates against the public interest, and its dissolution was recommended. To reach this conclusion the Commission takes the unusual course of setting out, in a separate paragraph, a theoretical interpretation of the main features of this case. It analyses an oligopolistic market structure with characteristic elements of price leadership and price fixing.[2] The reasons for the price fixing are partly historical; in the difficult and highly competitive conditions after the First World War the industry " began to develop a habit of price fixing " which continued. But the main reason for behaviour of this nature now lies in the structure of the industry. The industry is dominated by some half-a-dozen firms, one very much larger than the rest but the others all connected, in various ways, with foreign interests of comparable financial power. Each operates with a large amount of expensive special equipment and each knows that any aggressive market policy (pricing at less than short run marginal cost) on the part of any one of them might lead to a phase of cut-throat competition either at home or abroad " with disastrous effects on the profits of all." There is therefore " a powerful inducement to adjust their market behaviour to this situation even without any agreement to that effect," says the Commission. Dunlop predominates in the home and export markets, consequently this firm is, usually, in the position of price leader. But even Dunlop must act prudently in its pricing policy for fear of unpleasant financial results. Hence all the major firms have a strong incentive to avoid price competition and, " being few in number and fairly evenly matched in power, they can pursue this policy with a minimum of formal consultation, or with none at all." The Commission concludes that price competition " of the kind which

[1] It is notable that the Commission experiences no difficulty in establishing the existence of a price-fixing arrangement in this oligopolistic industry. Admittedly the procedure and timing of the Conferences makes the evidence conclusive. But the Commission (and most " economic " tribunals) would be satisfied with evidence establishing " conscious parallelism of action " in terms of price changes even for the purest case of oligopolistic understanding with no communication or agreement between the parties. By contrast, evidence of this nature is not likely to satisfy a court of justice (or a " legal " tribunal), which would demand knowledge of a written agreement or a verbal understanding. *E.g.*, the Supreme Court of the United States recently held that " economic evidence of conscious parallelism was not conclusive of conspiracy " (D. F. Turner, *Modern Law Review*, May 1955, pp. 257–8). And in the new (draft) Restrictive Trade Practices Bill the Restrictive Practices Court will base all of its judgments upon *agreements* of one description or another and will not venture into less-well-defined territory. This important area of oligopolistic understanding is clearly one where the wide terms of reference and flexible technique of investigation of the Commission could be usefully employed in the future.

[2] The Commission does not actually use the term " oligopoly."

is normal " cannot be expected in the tyre industry " without radical changes in the structure of the industry."

But even given an oligopolistically organised industry, price competition of some description is possible. First, on the manufacturing side the Commission takes the position that the conference procedure is redundant. Since an oligopolistic understanding exists anyway, tyre prices will remain more or less about the same level. Further, it is unlikely that the absence of discussion will lead to cut-throat competition. The theory of " competitive price leadership " which the Conference itself put forward as a guide to its behaviour is not compatible with such an outcome. And in support the Commission quotes a point made by Dunlop in evidence that it would be " an ill founded suggestion " to infer that prices would be much different " were there no consultation." Finally, the Commission noted that the foreign-controlled companies in Britain appeared satisfied with the pricing situation and were not likely to start a price war; in the export market a similar situation remained free of cut-throat competition, despite the absence of a conference procedure. On the other hand, were there no conference discussion there could be price competition within narrow limits which would help eliminate some of the rigidity of the T.M.C. system. Price changes would not be made quite simultaneously; there could be a development of different qualities, and therefore different prices, between manufacturers; and pressure from the distributors could probably compel a rather lower price for the less-popular makes. In addition, the lower-cost producers would not have the same knowledge of competitors' costs as before, and might feel compelled to move their prices a little nearer actual costs of production. While all of these are minor revisions of the T.M.C. regime, collectively they could make a significant contribution and, in the long run, lower the general level of prices. The tendency of the price-fixing procedure is to find " an average cost rather than the costs of the lower cost manufacturer." And the lower-cost manufacturers are often substantially below the average.[1]

[1] *Range of Costs* (*All Manufacturers*) 1953

	£	s.	d.	£	s.	d.	£	s.	d.
Car covers	2	6	9	3	11	2	4	0	11
Giant covers	11	18	0	13	0	5	16	2	7
Motor-cycle covers	1	11	3	1	18	5	2	3	9
Aircraft covers	8	12	2	41	0	0			

Range of Profit (% *of Capital*) *among Five Largest Producers*

	Lowest.	Highest.	Dunlop Group.	Weighted average.
1937	0·3	19·1	16·7	14·0
1948	24·3	53·3	29·3	28·1
1951	7·2	31·8	20·7	17·9
1952	2·7	20·4	11·5	10·8

" This wide variation in the profits of different manufacturers is consistent with the wide variations in their costs," although the correspondence is not always complete (para. 434).

" Since materials represented about 56% of the selling price of tyres in 1948 and 71% in 1951, it is evident that costs and profits are particularly sensitive to variations in commodity prices."

Secondly, the Commission seeks to introduce price competition on the distributive side of the replacement market. The resale conditions imposed by each manufacturer completely debar any form of price competition. Together with the T.M.C. discussion to fix identical prices this " brings about an extreme rigidity in the structure of prices and in the channels of distribution." Therefore the Commission finds that it cannot accept the industry's case that resale price maintenance is necessary to ensure " an efficient network of distribution " and " a proper tyre service " to customers. The cost of these conveniences is too great. But the problem of eliminating fixed prices in the distributive sphere is peculiarly difficult. Even given prohibition of the Conference discussions, the Commission is quite clear that either price leadership or informal discussions will lead to manufacturers setting more or less uniform retail prices. There is still the possibility that some distributors will cut prices and accept smaller margins. In relation to this, abolition of the price-enforcement machinery of the B.M.T.A. is considered; but it does not appear as a promising approach. Distributors would still be under contract to sell at manufacturers' price; a few might be willing to evade these obligations; but probably the main producers (five accounting for 90% of the output) would be strong enough, each acting individually, to provide reasonably efficient resale price maintenance for themselves. Consequently, the only way out of this difficulty, as the Commission sees it, is the unorthodox abolition of individual as well as collective resale price maintenance in the tyre industry. There are several merits to this course of action. Price competition would become possible among all of the 27,000 traders who supply the public. It might possibly encourage some competition among manufacturers in the prices at which they supply the replacement market and the retail prices they recommend to the trade. And it would leave the larger trader free to bargain individually with manufacturers for special discounts.[1]

The most interesting aspect of this report is the Commission's attitude to oligopoly. Confronted, on the manufacturing side, with what is almost a text-book example the Commission makes an accurate assessment of its important characteristics and goes on to a realistic appreciation of its advantages for the public interest. Superficial similarities do not mislead the Commission into an attempt to treat the situation as just another of the numerous cases of restricted competition operated by a trade association. It recognises the unique elements in the case: that small numbers and heavy capital investment protect the industry from competitive entry, and at the same time preclude price competition of any but the cut-throat type; it also

[1] This recommendation makes unnecessary the prohibition of the enforcement activities of the B.M.T.A.; and the Commission, probably on account of the many other industries involved, carefully declines to comment on the public interest of the enforcement system. On the other hand, the Commission makes critical comment on the domestic tribunal system and makes clear that it does not sympathise with a B.M.T.A. scheme to define by statute the powers of domestic tribunals, to give them surveillance by the law courts, the right to subpœna witnesses, etc.

recognises that the price leadership of Dunlop, despite the share of the market held by that firm, is far from being a monopolistic sinecure in view both of the excellence of competitors' products and their powerful technical and financial connections abroad. On the performance side the Commission appreciates that it has encountered in the tyre industry a form of competition in which the dynamic changes of the industry are of more significance for economic welfare than is the nature of the price structure at any given point in time. General performance is so impressive that the Commission is prepared to underwrite this " big-business " type of competition and is not tempted to recommend any form of intervention in the industry.[1] For instance, it does not suggest breaking up the Dunlop Group to provide a more competitive industrial structure. Nor does it suggest, as in the *Matches* report, price control of the industry. It prefers to see the industry continue independently to make what it has analysed as oligopolistic price-fixes provided the overt element of the procedure is eliminated and a moderate degree of price competition is allowed to develop.

Although they are not made explicit as such, one can pick out of the report those points on the development and performance of the industry which influenced this relatively favourable decision. Tyres are manufactured by a fairly young industry, and the rate of progress, in terms of fundamental technical improvements, has always been high. Considerable sums of money are spent on research to this end, both in Britain and abroad. In 1952 research expenses varied from 0·7 to 1·4% of sales. The heaviest expenses are incurred by Dunlop on behalf of the whole Dunlop Group and subsidiaries located abroad; the foreign-controlled companies tend to leave this work to their parent firms and pay a fee for it. Dunlop has an exceptionally good record in new products; it was first in the field with aeroplane tyres (1910), bullet-proof tyres (1917), giant pneumatic (1921) and tubeless tyres of natural rubber (1953); it has also taken the lead in the introduction of new materials, such as carbon black (1904) and rayon cords (1921), and in minor improvements, such as non-skid treads, special treads for snow and ice work, etc. The industry is now apparently " on the threshold of important developments " in the use of artificial rubber. And, in this country, Dunlop has again been the pioneer. A pilot plant is already in operation, and a larger experimental plant is building. Then, together with Goodyear, Firestone and Michelin, Dunlop has now formed an international company to manufacture in quantity for the tyre industry.[2] It would seem that the use of different combinations of natural and artificial rubber for different parts of tyre construction is likely to revolutionise the nature of

[1] The underwriting of oligopolistic forms of competition is not new in the Commission's reports; but it emerges more clearly in this report. See, for instance, the *Electric Lamps*, *Electric Cables* and *Insulin* reports for similar attitudes and recommendations; and cf. Hunter, *Manchester School*, January 1955, pp. 34–7.

[2] The International Synthetic Rubber Company formed in 1955 to manufacture 50,000 tons as against Dunlop's present 2,000 tons per annum. Manufacture will be based on butadeine, a petroleum by-product of the Esso Petroleum Company, which would not be manufactured in Britain without the guarantee that the tyre and rubber industry will absorb the output.

the product. Thus, on development work, the Commission does not appear to find any lack of enterprise in the industry. And concerning Dunlop's claim that as part of its leadership function it acts as a " corpus of knowledge" for the industry on tyre and rubber technique, it makes no adverse comment. In its conclusions the Commission goes so far as to state: " Apart from the specific matters mentioned in this report, we do not consider that Dunlop have used their dominant position in the industry to the detriment of the public interest, nor that the things that they do in order to maintain their leading position operate or may be expected to operate against the public interest; nor have we evidence to show that they may be expected so to operate in the future." In sum, the Commission appears to find the structure of the industry well adapted for the task of rapid economic development. It is probably this factor which most influenced the acceptance of a frankly oligopolistic market situation.

In addition the Commission must have been comforted by the knowledge that long-term competitive forces in the industry help safeguard the position. In the domestic market Dunlop will not in future dominate in every branch. Two formidable competitors from another industry, Monsanto Chemicals and I.C.I., have announced that they also intend going into the production of synthetic rubber. Their output is much smaller than that of the tyre group, and is probably not intended for tyre production; but its existence, and the possibility of expansion, must modify Dunlop's position. However, it is the competition of United States manufacturers in foreign markets which is the more important. As the result of war-time experience they are technically very advanced, especially in the field of synthetic rubber, where they appear to be ahead of Dunlop. The British industry, with exports at 25–30% of output, is the world's largest exporter; in addition, Dunlop and other firms have subsidiaries abroad. But since the United States domestic market accounts for five-sevenths of the world's motor vehicles, the American industry is clearly in a potentially very strong competitive position. Indeed, it is not merely the development characteristics of this oligopolistically organised industry which makes for a favourable attitude. The Commission is probably satisfied that any other industrial structure is unlikely to preserve this advantageous position in international trade in the face of American competition. On the other hand, the " competitive leadership system," under the strong hand of Dunlop, appears to have found a *modus vivendi* with the United States industry. The Commission, significantly, does not find Dunlop's informal pricing arrangements in international trade to be " against the public interest." The alternative to these arrangements is likely to be a price war, and the Commission accepts the view put forward by Dunlop that a price war would not be in the interests of this country. In the short run it would adversely move the terms of trade; and in the long run would probably lose markets to the financially more powerful American firms.[1]

[1] It is clear that, for the Commission, " the public interest " is on a national and not a world level of economic welfare.

IV

It can be concluded that for any " competitive " industrial structure the Commission's opinions are in line with orthodox economic thinking. Price competition is found to be a useful element in the process of competitive adjustment making for a better allocation of resources between different products within the industry, the encouragement of the efficient and the elimination of the inefficient producers, lower prices to the consumer, etc. Agreements to fix common prices restrict this adjustment, and therefore the presumption is that they operate against the public interest. Only in a few special cases have exceptions to this rule been made. In one report the argument that price competition eroded quality standards was accepted for some products; the technical reasons for safeguarding standards were convincing and important.[1] In two more cases, where the trade association also organised a programme of collective research and exchange of technical information and patents among members, thus effectively promoting a rapid rate of development in the industry, the Commission conceded that the fixing of common prices was reasonable compensation for this pooling of manufacturing knowledge and experience.[2] But for this particular exception to be allowed it is clear that the Commission looks for a measure of success from a research and development association not normally found in small-scale industry; it is significant that both industries concerned were markedly oligopolistic in character.

It is in fact in oligopolistic industries that the Commission's reaction to price fixing becomes less orthodox and less predictable. There is still a presumption in favour of price competition where, as in the *Tyres* report, its practice appears both feasible and useful. But it seems that the Commission would not insist too strongly on this point and would—as in the *Insulin* and *Electric Lamps* reports—permit price-fixing agreements in certain circumstances. Certainly, there seems to be some doubt as to the practicability, or the value, of price competition in an oligopolistic industry. On the other hand, the oligopolistic setting frequently provides compensation through other, mainly innovatory, forms of competition. This is not invariably the case, of course; if an industry has exhausted most opportunities of development then government price control, or even nationalisation, might appear as the appropriate recommendation. Clearly the right decision depends very much on the circumstances surrounding an oligopolistic price-fix; the flexible, empirical approach is here very necessary. For the Commission probably the most influential factor is the general performance of the oligopolists in whose hands the industry is.

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[1] *Electric Cables*, paras. 273, 283 and 287.
[2] *Electric Lamps* and *Insulin* reports.

THE OPTIMUM RATE OF SAVING

1. THE most important choice before the government of a developing country is the choice concerning the rate of savings, *i.e.*, the proportion of national income to be devoted to investment, and hence not available for consumption. So far this choice has been made, it seems, on rather arbitrary grounds. In the free-enterprise economies of the nineteenth century it was left to the citizens individually, and the national average probably reflected the income distribution rather than any deliberate policy. In Russia, the first country to make a deliberate choice, it seems that no theoretical concepts have been at the basis of the choice. In the western democracies after the Second World War the situation was not very different in this respect: although saving was controlled to a large extent by the governments, the basis of the figures chosen was just as arbitrary.

Since the choice is of such a far-reaching impact on the economy, the question seems in place whether a more rational basis can be given to such a choice.

2. There need not be, in principle, any difference between the choice an individual makes and the choice to be made for a nation as a whole. For the sake of convenience we will use the terminology applying to an individual's choice. Two types of factors seem to enter into the problem: (i) those referring to the objective consequences of the choice, and (ii) those pertaining to the valuation of these consequences. The consequences of an extra unit of savings are: (*a*) a reduction of present consumption, and (*b*) an increase in future production and hence consumption possibilities. The valuation of these consequences will be based on the significance to the individual of present and future consumption, being the ultimate aim of economic activity. A description of both groups of factors will have to be based on certain simplifying assumptions. Since the results to be obtained will to some extent depend on the nature of these assumptions, it seems appropriate to vary them somewhat so as, if possible, to cover the most relevant situations that may arise.

3. Concerning the *objective consequences* of a variation in savings rate we make the assumption of the existence of a fixed "capital coefficient," *i.e.*, ratio between the additional investments and the resulting increase in future income. This coefficient we will indicate by K; it is well known that for long periods values of about 3 have been observed, whereas recently lower values down to $1\frac{1}{2}$ have been found. When using these figures we should not overlook, however, that they imply the assumption that all increases in incomes are due to increases in capital. This may be a considerable overestimate of what can be obtained by saving only. This state of affairs is illustrated also by the fact that the average saver gets much less increase in income as a consequence of his saving. A capital coefficient of 3 would

imply a yield of 33%, whereas the ordinary saver usually gets only a few %. Even the entrepreneur-saver will often have returns of no more than 10 or 20%. There may therefore be scope to apply considerably higher capital coefficients in our interpretations, up to figures of, say, 20.

Our formulæ will permit us to calculate alternative results, depending on the value of K. Indicating investment by $\mathcal{J}$ and income by Y, and assuming to start with that there is a negligible time lag between investment and the subsequent rate of increase $\dot{Y}$, we will have:

$$\mathcal{J} = K\dot{Y} \quad . \quad . \quad . \quad . \quad . \quad (1)$$

In order not to make our problem too complicated, we will further assume that a decision on the savings rate will be taken once for all, meaning that the rate chosen will continue to be applied during all other time units. Indicating by c the proportion of income consumed, and by C the absolute quantity of consumption, we will therefore have:

$$C = cY \quad . \quad . \quad . \quad . \quad . \quad (2)$$

Since, in addition,

$$Y = C + \mathcal{J} \quad . \quad . \quad . \quad . \quad (3)$$

the future development of consumption will be determined by these two coefficients: [1]

$$Y(1 - c) = K\dot{Y} \quad . \quad . \quad . \quad . \quad (4)$$

$$Y_t = Y_0 \, exp\left(\frac{1 - c}{K} t\right) = Y_0 e^{\frac{1-c}{K}t} \quad . \quad . \quad . \quad (5)$$

$$C_t = cY_0 \, exp\left(\frac{1 - c}{K} t\right) \quad . \quad . \quad . \quad . \quad (6)$$

Here the subscripts t and 0 refer to time periods.

An alternative assumption with regard to the objective consequences of savings is that there be a lag of one time unit (for which a year was taken when we gave numerical values for K), leading to slightly different equations:

$$\mathcal{J}_t = K(Y_{t+1} - Y_t) \quad . \quad . \quad . \quad . \quad (1')$$

$$Y_{t+1} = \frac{1 - c + K}{K} Y_t \quad . \quad . \quad . \quad . \quad (4')$$

and

$$C_t = cY_0\left(\frac{1 - c + K}{K}\right)^t \quad . \quad . \quad . \quad . \quad (6')$$

4. As to the *valuation* by the individual (or the nation) of the results to be obtained from whatever decision on savings, we assume that the criterion will be the " utility " to be derived from all consumption, present and future. This utility we assume to be measurable, and to have the following characteristics:

(i) it is the sum total of the utilities to be derived from the consumption in each of the infinite series of time units;

(ii) it diminishes, for the same volume of consumption per time

[1] The reader will observe the similarity of this treatment to that given by R. F. Harrod, "An Essay in Dynamic Theory," ECONOMIC JOURNAL, XLIX (1939), p. 14.

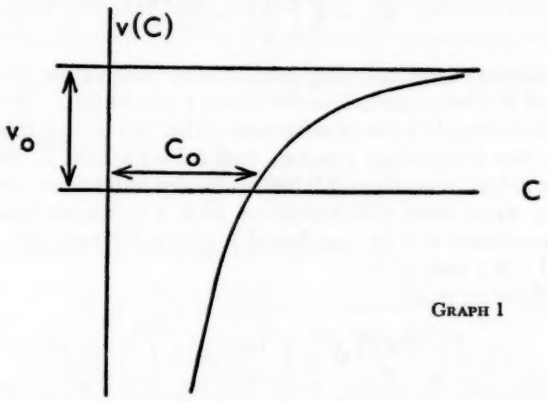
unit, if the time of consumption becomes more remote, proportional to a " discount factor " π^t, where $n - 1$ may be called the " psychological discount rate," comparable to an interest rate;

(iii) it increases, for a given time of consumption, with increasing volume C of consumption, but proportional to a function $v(C)$ showing decreasing marginal rates of increase; *i.e.*, $v'(C)>0$, $v''(C)<0$. More specifically two functions $v(C)$ have been used alternatively, namely:

(*a*) $$v(C) = \log C \quad . \quad . \quad . \quad . \quad . \quad (7)$$

(*b*) $$v(C) = v_0\left(\frac{1 - C_0}{C^E}\right) \quad . \quad . \quad . \quad . \quad (7')$$

The former of these two functions needs no further explanation; evidently the marginal utility $v'(C) = \frac{1}{C}$ diminishes with increasing C, but never becomes zero, whereas $v(C)$ has no upper boundary. The latter of the functions, illustrated by graph 1, is a hyperbola with a horizontal asymptote



GRAPH 1

at $v(C) = v_0$, *i.e.*, this $v(C)$ has an upper boundary. Both have in common that for no finite value of C, $v'(C) = 0$, *i.e.*, saturation is not supposed to be reached for any finite value of C. In the second function an arbitrary constant E has been included, enabling us to produce alternative shapes of curves. For large values of E the saturation level will be approached more quickly than for small values. For $E = 1$ the hyperbola is equilateral. The value of E will influence the marginal utility of consumption, on which statistical estimates have been made by Frisch.[1] Indicating the flexibility of the marginal utility of consumption by f, we have

$$f = \frac{C}{v'}\frac{\partial v'}{\partial C} = -(E + 1)$$

According to Frisch's findings, this flexibility was about −3·5 for French

[1] R. Frisch, *New Methods of Measuring Marginal Utility* (Tübingen, 1931): *Statistical Confluence Analysis by Means of Complete Regression Systems* (Universitetets Økonomiske Institutt, Publikasjon nr 5, Oslo, 1934).

workers and about -1 for American workers. The corresponding values for E are $E = 2{\cdot}5$ and $E = 0$ respectively.

Reference should be made finally to the well-known article about our subject published already in 1928 by Ramsey.[1] Ramsey, in his most imaginative pioneering approach, laid more stress on the existence of some finite income for which a state of complete satisfaction (" bliss ") would be attained. His approach is somewhat less easy for numerical application, however, since it is difficult to make numerical assumptions on this income; but for high values of E the value v_0 will be " almost " reached for " low " values of C already.

Indicating the utility of all consumption by U, we will have, according to our characteristics, in case (a):

$$U_a = \int_0^\infty \frac{\log C_t}{n^t}\,dt \quad . \quad . \quad . \quad . \quad . \quad (8)$$

and in case (b):

$$U_b = v_0 \int_0^\infty \left(1 - \frac{C_0}{C_t^E}\right)\frac{dt}{n^t} \quad . \quad . \quad . \quad (8')$$

5. We will now investigate the question for what values of c, with given values of n and K, these expressions for U are a maximum. In order to give the answer we evidently have to substitute either (6) or (6′) into (8) or (8′), to carry out the integration process, and subsequently to determine the maximum as a function of c. We will consider only three out of the four possible cases, since these will supply us with a sufficient insight into the answer. These cases will be numbered I (using (6) and (8)), II ((6) and (8′)) and III ((6′) and (8′)).

Case I. Here we find:

$$U_a = \int_0^\infty \frac{\log Y_0}{n^t}\,dt + \int_0^\infty \frac{\log c}{n^t}\,dt + \int_0^\infty \frac{(1-c)t}{n^{tK}}\,dt \quad . \quad (9)$$

We will use two auxiliary formulæ for two integrals:

$$\int_0^\infty \frac{dt}{n^t} = \frac{1}{\log n} \quad . \quad . \quad . \quad . \quad (10)$$

and

$$\int_0^\infty \frac{t\,dt}{n^t} = \frac{1}{\log^2 n} \quad . \quad . \quad . \quad . \quad (11)$$

With their aid we find:

$$U_a = \frac{\log Y_0 + \log c}{m} + \frac{1-c}{K}\frac{1}{m^2} \quad . \quad . \quad . \quad (12)$$

where m has been written for $\log n$; it so happens that approximately m equals the interest rate $n - 1$, since for small m, $\log(1+m) = m$. Even for a value of $m = 0{\cdot}3$, $\log(1+m) = 0{\cdot}26$, meaning that *qua* order of magnitude the approximation even holds for such high values as $0{\cdot}3$.

[1] F. P. Ramsey, " A Mathematical Theory of Saving," Economic Journal, XXXVIII (1928), p. 543.

In order to find the optimum value of c we have to determine the maximum of U_a with respect to c; this optimum satisfies the relation

$$\frac{dU_a}{dc} = 0$$

which leads to

$$\frac{m}{c} = \frac{1}{K} \text{ or } c = mK \quad . \quad . \quad . \quad . \quad (13)$$

With $m = 0{\cdot}05$ and $0{\cdot}10$ and $K = 2$, 3 and 10 respectively, we find:[1]

	m =	0·05	0·10	0·30
K=				
2	c =	0·10	0·20	0·60
3	=	0·15	0·30	0·90
10	=	0·50	1·00	.
20	=	1·00	.	.

For the lower values of K and m these figures are amazingly low: they correspond to savings rates between 0·9 and 0·7. In order to obtain the value most commonly observed, *i.e.*, $c = 0{\cdot}9$, we would have to assume either values for K of 9 and higher, or, if $K = 3$, a psychological discount rate of $\frac{0{\cdot}9}{K}$, *i.e.*, 0·3.

6. *Case II.* Here,

$$U_b = v_0 \int_0^\infty \frac{dt}{n^t} - \frac{v_0 C_0}{c Y_0} \int_0^\infty \frac{dt}{\left(e^{\frac{1-c}{K} E} n\right)^t} \quad . \quad . \quad . \quad (9')$$

which, with the aid of (10) and (11), reduces to:

$$U_b = \frac{v_0}{\log n} - \frac{v_0 C_0}{c^E Y_0^E} \cdot \frac{1}{\log n + E \frac{1-c}{K}} \quad . \quad . \quad (12')$$

Writing m again for $\log n$, we will have to look for the value of c which renders

$$c^E \left(m + \frac{1-c}{K} E \right)$$

a maximum. We find

$$c = \frac{Km + E}{E + 1} \quad . \quad . \quad . \quad . \quad (13')$$

For $E = 0$ this formula coincides with (13). For some higher values for E and the same values of K and m as considered above we find:

	$E = 1$				$E = 2{\cdot}5$		
K =	m =	0·05	0·10	0·30	0·05	0·10	0·30
2	c =	0·55	0·60	0·80	0·74	0·77	0·89
3		0·58	0·65	0·95	0·76	0·80	0·97
10		0·75	1·00	.	0·86	1·00	.
20		1·00	.	.	1·00	.	.

[1] Dots will be shown where values for $c > 1$ are found; they will have to be replaced by the boundary condition $c = 1$.

Again for the lower values of K and m and $E = 1$, we find consumption quota much lower than observation yields. For $E = 2{\cdot}5$ more realistic figures are found. Evidently we can obtain figures as close to 1 as we want if only E is taken high enough, and then irrespective of what m and K are. Figures near 1 may also be obtained for the values of K approaching 10 or for values of m approaching 0·30.

Case III. Here finally

$$U_b = v_0 \int_0^\infty \frac{dt}{n^t} - \frac{v_0 C_0}{c Y_0} \int_0^\infty \frac{dt}{\left(n \frac{1 - c + K}{K}\right)^t} \quad . \quad . \quad (9'')$$

or

$$U_b = \frac{v_0}{m} - \frac{v_0 C_0}{c Y_0} \frac{1}{m + \log \frac{1 - c + K}{K}} \quad . \quad . \quad (12'')$$

Now the expression $cm + c \log (1 - c + K) - c \log K$ should be a maximum. This leads to a transcendental equation for c which for $m = 0{\cdot}1$ and $K = 3$ yields an optimum value of $c = 0{\cdot}7$. Again we find in order to obtain a value for c equal to almost 1 we have to assume a value of m of some 0·3 or more.

7. Some *tentative conclusions* may be drawn. They will have to be tentative, since evidently quite some influence appears to be exerted by: (i) the form of the utility function assumed; (ii) the values given to K; (iii) the values given to m; and (iv) those given to E.

(i) As regards the *utility function*, it would seem that our second function already somewhat overemphasises the phenomenon of diminishing marginal utility, since it assumes a ceiling for utility which according to many economists does not exist. The existence of such a ceiling will reduce the attractiveness to save, since additional units of future consumption will not add very much to U any more. The saving rates found with U_b therefore tend already, in our opinion, to be under-estimated.

(ii) The values to be given to the *capital coefficient* K, we saw, have to depend on whether we assume that, together with increased savings, there will be forthcoming the increased technological knowledge, organisation, etc., that, in the history of developed countries, accompanied the growth of their capital assets. In other words, whether together with savings the growth of knowledge and organisation can also be accelerated. If this is assumed to be the case, we should give to K the values of about 3 or even a little less; if not, K may be considerably higher, up to 20.

(iii) The values to be given to the *psychological discount rate* m may for individuals be quite high, as some well-known facts about money-lending rates show. This evidently particularly applies to individuals living near starvation. For a nation as a whole some would even maintain that it should be taken equal to zero.

(iv) The values of E evidently also depend on the level of well-being, and may therefore not be, at least for individuals, independent of the values for m.

Our first tentative conclusion from the tables shown is that optimum savings rates may well be considerably higher than observed saving rates, especially for developed countries (where E and m are low).

This conclusion also would apply for all countries if it is maintained that m should be taken equal to almost zero. The conclusion does not, however, apply if, with moderate values of m, K is considered to be above 10 anyhow.

A second tentative conclusion is that in order to explain observed personal rates of saving prevailing in most countries we must assume that either the capital coefficient is supposed to be much higher than the values usually now presented or the psychological discount rate is considerably higher than normal interest rates.

A third and last tentative conclusion is that the preceding conclusions are not influenced very much by a possible longer lag between investment and the resulting increase in income. This is shown, on the one hand, by a comparison of Cases II and III; on the other hand, it follows from a change in time units, which we might undertake. Suppose we take two years instead of one year as our time unit. This would reduce by 50% the value of K and raise by about 100% the value of m. Their product would not change appreciably, and hence the optimum values found for c would not either.

8. Some *final remarks* have to be added. The problem discussed is a well-known problem with some well-known difficulties. If the two characteristics (ii) and (iii) of the utility function introduced in Section 4 are neglected, the problem becomes intractable; if total consumption over an infinite period is to be maximised, the maximum will be found to correspond to the highest savings rate possible; *i.e.*, 1, which evidently is an unrealistic proposition. Even if the discount factor is introduced, this difficulty does not vanish. For values of m below the rate of increase in income again the optimum rate of savings will be 1. For values of m above that rate it will suddenly fall down to zero. This evidently even qualitatively is not a realistic picture of the choice problem before us. These experiences should be kept in mind when the idea of an optimum rate of savings is loosely being discussed in terms of a " maximum income or maximum consumption over a certain period." Only the introduction of both the characteristics seems to make the problem a tractable one.

Admittedly the approach chosen here is in many respects oversimplified still. It has been assumed that only one choice is made with regard to c and that this is a choice for all times. Evidently a more flexible approach is conceivable, where c would change as time goes on. Also the utility function might express two features not introduced explicitly—although present implicitly in our models: the feature of a minimum subsistence level and the one of a possible ceiling to consumption. As we already stated, we do not think that our conclusions will be invalidated by such refinements; but we have to admit that further research might reveal such limitations. The purpose of this paper is no other than to stimulate this further research.

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MR. HARROD ON THE BRITISH BOOM

MR. HARROD in his article in the ECONOMIC JOURNAL for March 1956, approaches the "British Boom, 1954–55," from the standpoint of Keynes's *General Theory*, interpreted in the light of the *Treatise on Money*. The "windfall profit," which the *Treatise* identified with "an excess of investment over saving," is the excess profit arising from a disparity of prices and costs. The *General Theory* makes the price level less fundamental:

> "When there is unemployment" [Mr. Harrod writes (pp. 2–3)] "an increment of investment has its main effect in expanding employment; but as we approach a full employment ceiling the increase in demand, due to the increment of investment and to its operation through the multiplier, has a divided effect, increasing employment somewhat, but also raising prices; finally at the point of absolutely full employment, any further increment of demand has its whole effect in producing a price rise. The excess of aggregate effective demand over the supply potential may be called the 'inflationary gap.'"

During the war the inflationary process was—

> "deliberately obstructed by war-time controls. . . . While such measures as taxation and the restriction of private investment tend to narrow the gap, price controls and rationing, formal or informal, do not do so; . . . they ensure that the gap that remains, instead of finding expression in a certain rise of prices, finds expression of equivalent value in unsatisfied demand."

In the chapter on the Theory of Prices in the *General Theory* (p. 303), Keynes described the condition of "true inflation," when "a further increase in the quantity of effective demand produces no further increase in output, and entirely spends itself on an increase in the cost-unit fully proportionate to the increase in effective demand." His analysis was consistently *static*, and was not concerned with the transitional conditions intervening before the full effect of demand on the cost-unit and on prices was felt.

The war-time price controls, however, could not be passed over as merely transitional. And Mr. Harrod amends Keynes's version of inflation by introducing the case of suppressed inflation and unsatisfied demand.

But, he points out, the appearance of unsatisfied demand and of its accompaniment of delivery delay is not peculiar to a regime of price controls. The representative entrepreneur, encountering an increased effective demand, does not "raise his price sufficiently to equate demand to supply and keep his order books of normal length. . . . He pursues a conservative pricing policy, and allows his order book to lengthen" (p. 4).

Undoubtedly, this is a very necessary modification of Keynes's analysis;

it is " part of the normal functioning of an inflationary economy." But it is not quite accurate to describe the situation as one of *unsatisfied* demand, for the demand of the consumers and users may be fully satisfied, without a rise of prices, from stocks (and from imports). The demand from traders for the replenishment of their stocks may be " unsatisfied " in consequence of delays in delivery. But a trader maintains a substantial margin of stocks in excess of the irreducible minimum, and, so long as some margin is preserved, he can afford to wait: supplies on order are then equivalent to supplies in hand. When wholesale dealers' stocks of a commodity decline towards the irreducible minimum, they raise their price above the replacement value, retailers follow, and the excess demand is checked. When wholesale dealers increase their margins, the producers are likely to reconsider their conservative pricing policy. And at this stage wage increases are likely to be granted, and the rise in the cost-unit is then reflected in a rise in price. It is when controls prevent the raising of prices that the consumers' demand is unsatisfied and shop shortages occur. But in the absence of a wage control, price control cannot prevail against a rise in costs.

Thus it is quite normal for an expansion of demand to be accompanied by no rise of prices or by a less than proportional rise. Yet the excess demand is not unsatisfied: there is an excess of spending over output which is *satisfied* from stocks, supplemented, if need be, from imports. Keynes's principle that saving and investment are identically equal really means that spending and output are identically equal, for saving plus consumption is equal to income and therefore to output, and spending is composed of investment plus consumption. The existence of excess spending is reconciled with this identity because in Keynes's phraseology the depletion of stocks is disinvestment, and the disbursements applied to it do not count as spending.

When over-spending occurs, and stocks are diminished, the immediate effect is to substitute a quantity of goods on order for an equal quantity of goods in stock. The " time interval between order and delivery " (p. 1) is lengthened. Mr. Harrod rightly calls attention to the importance of that factor.

To keep a manufacturing concern employed up to capacity, the completion of an order must always leave fresh orders to be started on. The flow of orders in an industry corresponds to the disposals of the product to consumers or users. If the flow exceeds the capacity of the industry, unexecuted orders begin to accumulate, and dealers' stocks to diminish. If the excess demand is transitory, so that it can be absorbed in stocks in the interval before the orders for replenishment are completed, there need be no significant reaction on the industry. But if the excess demand is believed to be more persistent, producers will extend their capital equipment (the acceleration principle) and seek more labour.

When excess spending occurs in the community as a whole, the excess demand is not confined to the products of a single industry, but is felt throughout industry. The excess demand for finished products is extended by the acceleration principle to instrumental products. Output can be

expanded beyond normal capacity by means of overtime, and, so long as output keeps pace with demand, there cannot be said to be an excess demand. But if, when output reaches its limit, manufacturers still pursue the "conservative pricing policy," there is little room for an "inflationary gap" measured by excess profits. And if excess demand takes effect only in an increased volume of orders on hand, there is no increase in income.

The excess demand causes an excess demand for labour, a state of over-employment, of which abnormal overtime is one of the symptoms, and there results a rise of wages. The process culminates in Keynes's "true inflation," when the increase in effective demand "spends itself on an increase in the cost-unit."

Mr. Harrod, in looking for the causes of the expansive movement of 1954–55, starts from Keynes's principle of "the increment of investment and its operation through the multiplier" (p. 3), as modified by the introduction of unsatisfied demand, and he sees evidence of an "industrial investment boom of very great magnitude" (p. 5) in the statistics of new factories started. Those started in the twelve months to June 1955 show a total, in square feet of factory space, 77% above the average for the five years 1949–53. Though "new factory building is but a small part of the total demand upon the building industry, what is important is the associated demands for industrial equipment." Since he wrote, later statistics have become available, and they add force to his contention, for the index for the whole year 1955 is no less than 207·8.

The explanation is given in the *Economic Survey* for 1956 (p. 45): "with the removal of controls late in 1954, building owners were free from the beginning of 1955, for the first time since the beginning of the War, to put in hand such work as the building and civil engineering industry was willing to undertake." There was thus a big increase in orders on hand so far as the building of factories itself is concerned, but in the circumstances it would not be warrantable to infer a corresponding increase in orders for equipment. For the effect of the controls may be supposed to have been an accumulation of arrears of replacements and extensions of factory space, without any corresponding accumulation of arrears of replacements and extensions of plant.

But, if the increase in factory building is to be accounted the cause of the boom of 1954–55, when did the boom begin? Mr. Harrod says that "by the Autumn of 1954 it was evident that the British economy was becoming subject to severe inflationary pressure" (p. 5). But that was not the beginning.

The index of industrial production shows a set-back in 1951 and 1952, but a substantial revival in 1953:

January 1951	116
,, 1952	117
,, 1953	118
,, 1954	129
,, 1955	135
,, 1956	139

The set-back in 1951–52 was almost entirely attributable to the textile and clothing industries, the production index of which has been:

January 1951	119
,, 1952	104
,, 1953	111
,, 1954	119
,, 1955	118

The number of unemployed in the textile industry rose from 6,842 in June 1951 to 153,238 in June 1952 and fell again to 16,437 in June 1953. The unemployment percentage in industries other than textiles and clothing rose only slightly in 1952.

The textile and clothing trades suffered from the inordinate rise in the prices of their raw materials (due to stock piling) in the spring of 1951. The index numbers of cotton and wool rose to 248·1 and 297·2 in May 1951, and cotton fell to 142·1 in January 1953 and wool to 125·6 in April 1952. The fluctuations were so considerable as to affect materially the prices of their finished products, so that markets at home and abroad felt the depressing effect of falling prices on sales.

As the textile and clothing industries account for one-eighth in the weighting of the index of industrial production, it is possible to calculate the index for the other industries:

January 1951	116
,, 1952	119
,, 1953	119
,, 1954	130
,, 1955	137
,, 1956	142

This shows a continuous expansion interrupted by a pause rather than a set-back in 1952, and resumed with an exceptional increase in 1953. The average weekly hours worked (men) show the progressive increase in overtime:

	April.	October.
1949	46·6	46·8
1950	47·0	47·6
1951	47·9	47·8
1952	47·3	47·7
1953	47·8	47·9
1954	48·3	48·5
1955	48·9	48·9

Mr. Harrod's index of factory building records an increase only from the middle of 1954. Actually the index for the first half of 1954 is 145, and already shows a big increase over the previous highest, and for the second half it is 157, making 151 for the year. But this does not help to explain the rapid increase in activity in 1953. And in the years 1952 and 1953 the

starts of factory building were reduced to an exceptionally low level because controls were tightened in order to release resources for rearmament expenditure. The year 1954 did no more than overtake the arrears of factory building accumulated in the two preceding years.

How far does " the increment of investment and its operation through the multiplier " help us to interpret the statistical material? In the working of the multiplier account must be taken not only of investment but of the expenditure of public authorities on goods and services. The following table shows the proportion (per cent) of expenditure on fixed capital formation, and of expenditure of public authorities, to gross national output for six years:

	1950.	1951.	1952.	1953.	1954.	1955.
Fixed capital . .	14·6	14·8	15·1	15·8	16·0	17·1
Public Authorities .	17·8	19·1	20·8	20·5	19·7	19·0
	32·4	33·9	35·9	36·3	35·7	36·1

The total has been remarkably steady. The substantial increase in public authorities' expenditure in the years 1950–52 was partly compensated by a relative stagnation of capital outlay, and the subsequent decline in public authorities' expenditure has been offset by a rise in capital outlay. The rise in capital outlay in 1955 may well be connected with the increased factory building then started, but it barely compensated the decrease in expenditure of public authorities since 1952. There may have been a further accumulation of orders for equipment. The orders on hand for machine tools have risen substantially since 1953, but, if allowance be made for the rise of prices, they have not yet reached the level of 1952. Other statistics of orders on hand are not to be had.

" Investment," as defined by Keynes, includes " the increment of capital equipment, whether it consists of fixed capital, working capital or liquid capital." Any excess spending is met either from stocks (liquid capital) or from imports, but we cannot take the state of stocks and imports as a simple indicator of excess spending because a *designed* net addition to stocks must be reckoned as spending. When traders' stocks are being depleted by excess spending, and industry is employed up to capacity, they will tend to replenish stocks, and to keep the total up to what they think convenient, by importing supplies and by retaining exportable goods at home. If they succeed in keeping their stocks at the acceptable level in this way, the adverse balance of payments will be equal to the over-spending. But in the years 1951–55, when productive capacity has been so severely strained, there has been a net *favourable* balance of payments of £166 million. And traders' stocks have greatly increased. The following table shows, year by year, the total value (in £ million) of traders' stocks (including Government trading stocks, but excluding surplus and strategic stocks), together with so much of each yearly increase as was attributable to quantity and not to price:

Year.	Value of Stocks.[1]	Quantitative increase.	
		Value.	%
1946	3,723	51	1·37
1947	3,899	422	10·82
1948	4,771	235	4·93
1949	5,331	97	1·82
1950	5,628	−183	−3·25
1951	6,095	471	7·73
1952	7,316	8	0·11
1953	7,274	83	1·14
1954	7,282	31	0·42
1955	7,388	297	4·02
1956	7,885	—	—

[1] At the beginning of the year.

In the years 1946–49 there was a cumulative increase of 20%. The American and Canadian loans, followed by Marshall Aid, may be assumed to have gone far towards making good the war-time loss of stocks. The reduction of stocks in 1950 is no doubt explained by the more severe import restrictions imposed after devaluation. Over the two years 1950 and 1951 taken together the increase was 4·2%. A relaxation of import restrictions in 1951 allowed an increase of 13% in the volume of imports. The rise in the prices of imported materials resulted in adverse terms of trade, and there was an adverse balance of £403 million. The cumulative increase in stocks from the end of 1949 to the end of 1954 was 6%, a yearly average of 1·2%. As the index of industrial production rose from 106 in 1949 to 130 in 1954, the increase in stocks was far from keeping pace with it. It was only in 1955 that there was once more a substantial increase. The following table compares the increase in stocks with the volume of imports:

	Increase in stocks, £ million.	Volume of imports, 100 in 1950.	Balance of visible trade, £ million.	Balance of payments, £ million.
1949	97	100	−137	+ 31
1950	−183	100	−133	+300
1951	471	113	−743	−403
1952	8	103	−117	+247
1953	83	112	−217	+177
1954	31	114	−192	+205
1955	297	131	−352	−103

Where are we to look for an explanation of the sudden increase in stocks and in imports in 1955?

Keynes's monetary theory was based on the rate of interest. A rate of interest below that which corresponds to full employment produces " a state of true inflation " (*General Theory*, p. 202). But he adhered to the view, argued in the *Treatise on Money* (Vol. I, p. 195; Vol. II, pp. 137–42 and 363) that the effect of changes in the rate of interest on traders' stocks is insignificant. An important part of his argument was that the charge for interest is small compared with the gain or loss through price fluctuations, but the price fluctuations he had in mind were those of primary products, such as

cotton, copper or wool. Of stocks of finished products he had nothing to say.

In the *General Theory* (pp. 141–4) he pointed out that expected changes in the wealth-value of the money unit affect activity because they affect the marginal efficiency of capital. The rate of interest which corresponds to full employment is the rate which is equal to the marginal efficiency of capital. If the money unit is expected to decline in value, that is to say, the price level is expected to rise, the rate of interest must be so much the higher, or else the " state of true inflation " will supervene.

In the chapter of the *General Theory* on Properties of Interest and Money Keynes points out the distinction between those capital-assets, such as houses, of which the yield is substantial while the carrying cost is negligible, and those, such as wheat, of which the yield is negligible and the carrying cost substantial. He attributed to a stock of wheat a " marginal efficiency " of $a–c$, where a is an expected rise of price and c the carrying cost. Since only those assets will be newly produced of which the marginal efficiency exceeds the rate of interest (*General Theory*, p. 228), no wheat will be produced unless the price of wheat is expected to rise to an extent sufficient to cover carrying costs *plus* interest. Of course the " rise " Keynes had in mind was not a rise in the price of wheat quoted in the market, but the difference between the dealer's buying price and his selling price. For wheat, and for stock-held goods in general regarded as capital assets, that difference represents " marginal efficiency " so long as market prices are expected to remain unchanged.

It was only for the sake of a formal analysis that Keynes made the rate of interest the decisive factor in determining whether any wheat was to be produced. Nevertheless, his concept of wheat or any other stock-held product as a capital asset with a " marginal efficiency " becomes significant in the case where a rise of market price is anticipated. A purchase of a surplus stock of the product with borrowed money appears profitable unless the rate of interest reckoned over the period to the resale of the product is high enough to offset the hoped-for rise of price. If there is an anticipation of a general rise of prices, so that the purchase of practically all products looks profitable, there may be extensive purchases amounting in the aggregate to a heavy item of investment. The rate of interest becomes a determining factor for those traders who have no redundant cash balances at the time, and who, therefore, have to make their extra purchases with borrowed money.

The devaluation of 1949 suddenly held out the prospect of a general rise of prices. It raised by 44% the sterling equivalent of those international prices that were reckoned in dollars. And as at the time the United States was the only important competitor to be met in international markets for manufactured goods, British manufacturers could look forward to an enormous increase in the prices they could ask. Nevertheless, in conformity with the " conservative " pricing policy, they tended to quote prices based on costs, *plus* a reasonable or conventional profit margin. The Government

appealed for a standstill of wages, and up to the end of 1950 increases of wages were very slight. The price index of materials used in manufacture (100 in June 1949) averaged in that year 138·6, and the price index of British manufactured goods was only 106·8.

In 1951 the standstill of wages was not persisted in. There ensued the biggest total of wage increases ever recorded in one year (£6,569,000 a week). The index of weekly wage-rates, which had risen only from 109 in September 1949 to 110 in September 1950, advanced in December 1951 to 126. The rise in costs was bound to mean a rise in prices, and it was easy for traders who watched the state of the labour market, and the progress of negotiations in industry after industry, to foresee price rises. But there was a further complication. The Korean crisis led to enormous stock-piling measures in Great Britain and America, and the prices of materials rose to a high level. The index rose in April 1951 to 209. It may be supposed that the rise in cost of materials along with the rise in wages stimulated purchases of manufactured goods for stock in the early part of 1951. On the other hand, there ensued a fall in prices of materials which in the course of three years brought the index down to 143·5. Though wages continued to rise, and the index of weekly wages reached 144 at the end of 1954, the price index of manufactured goods remained very stable, averaging 124·8 in 1951 and 125·5 in 1954.

In 1955 wages continued to rise, the index at the end of the year being 154. But the rise was no longer compensated by a fall in the cost of materials, the price index of which rose to 155·3. The price index of manufactured goods rose from 126·3 at the end of 1954 to 132·5 at the end of 1955.

The rise in materials reflected a rise in world prices; as Mr. Harrod says (p. 13), "the boom has now become world-wide." And the conditions favouring increases of wages were continuing; they were indeed gathering increased force, and were becoming familiar to everyone.

In the organised markets for staple primary products prices are determined speculatively. Forward dealers, who provide hedging facilities for traders who want to avoid speculating, are themselves professional speculators. The total stocks of such products to be held at a given moment are a determinate quantity, only to be varied by long-range decisions of producers. The speculative buyer does not have to become the physical possessor of a stock: he makes a forward purchase, which can be settled by a money payment when it matures, and can be prolonged from settlement to settlement.

Manufactured products, on the other hand, are not adapted to this type of transaction. The trader who wants to speculate on a rise of price makes his purchase in the form of an order to a manufacturer, and he has to accept the goods ordered when they are ready. Consequently, when market conditions favour speculation, the speculative purchases take visible shape in *additions to stocks*.

The conditions in 1955, when the prices quoted by manufacturers were still far below what markets would bear, were such as to induce speculative purchases on a great scale. The strain on the country's productive power at the present time, the scarcity of labour, the excessive overtime, the recur-

rence of an adverse balance of payments, these developments are quite rightly attributed to excess spending, but the excess spending is neither on consumption nor on capital outlay; it is on speculative purchases of finished products. The effect of the speculative purchases is not to be seen in the actual increases in stocks (which has been less than in proportion to output) but in the accumulation of unfilled orders. This accumulation represents forward purchases by traders who have good reason to expect prices to rise, and for whom therefore the " marginal efficiency " of stock-held goods is high.

When Bank Rate was put up to 4½% in February 1955 prices of manufactured goods were rising, and in the year that followed up to the further advance to 5½%, the rise of prices was accelerated. In the circumstances even the latter rate is to be reckoned low.

In 1920 prices were rising more rapidly than at the present time, and a rise of Bank Rate to 7% proved sufficient to check the rise. Critics of the Bank Rate policy would be found to shrink in horror from such a rate. But the only substantial ground for fearing it is that it would do its work. So long as the high rate merely diminishes the extra profit derived from rising prices, it places no burden on industry. And when prices cease to rise, the rate can be reduced; indeed, the immediate reduction of a high rate, as soon as its deterrent effect has been really felt, is an essential feature of the Bank Rate policy.

What short-term rate of interest would suffice to offset the expectation of rising prices? [1] So far as prices of materials are concerned, the organised markets, with their hedging facilities, may be assumed to take account of speculative prospects in current prices. The prices of finished products being governed by costs, the rate at which prices are expected to rise will approximate to the rate at which wages are expected to rise. The rise in the index of weekly wages from September 1950 to December 1951 was at the rate of 11% per annum. In the following three years the rise averaged 4½%. But in 1955 it was accelerated, and in the five months from December 1955 to May 1956 it was no less than 6½%, or at the rate of 16% per annum.

The index for May, 164, is 51% above that for 1949. The American index of hourly earnings has increased in the same period by 36%, so that British costs have covered only about 11% of the disparity of 44% created by devaluation. Even if something be allowed for American productivity per head having grown faster than British, the rise in British wages still has a long way to go before the disparity is extinguished—and there are signs portending a further rise in American wages, which will increase the distance to be covered.

If the traders who buy goods for stock become fully aware of this situation, may they not speculate on a rise of prices too great to be offset by any rate of short-term interest that can be practically contemplated? If a high rate (say, 10%) were found insufficient, recourse might be had to a restriction of

[1] It has been argued that only the net burden of interest, after deduction of income tax, is to be reckoned as deterrent. But as tax is paid on the profit from rising prices, gross interest must be set against gross profit.

advances. The "credit squeeze" might be more particularly directed against traders seeking to carry unnecessarily large stocks. How far the credit squeeze can be said to work on those lines, I do not know. We may suppose a borrowing trader to be reluctant to submit to criticism from his banker on matters on which he would suppose himself to be better qualified to judge than the banker.

What makes the speculation intractable is adherence to a rate of exchange which *ensures* a rise of the price-level up to a specifiable limit. The speculators believe themselves to be betting on a certainty. The best corrective would be a removal of that certainty from their minds.

When the Governor of the Bank of England, in October 1955, expressed his opinion that the pound was still undervalued, the natural sequel would have been a revision of the rate of exchange upwards. Yet the possibility of such a step was not seriously entertained. On the contrary, so far as his pronouncement was noticed at all by the public, the inference would seem to have been that there was plenty of room for further increases of wages and prices. At any rate, the rise of the wage-level has been accelerated.

Suppose the speculative purchase of finished products to be successfully quelled, whether by dear money, by the credit squeeze or by a prospect of a rise in the dollar value of the pound. The congestion of orders to manufacturers would be relieved, productive power would be released for export business, the excessive resort to overtime would cease.

The extent of the overtime which is being worked is revealed by the statistics of weekly hours. In October 1946 the average hours worked were substantially the same as in October 1938, 47·7 per week. After the big reductions of hours in 1946–48, amounting to two hours or more per week, the average was 46·8 in October 1949 and 47·6 in October 1950. The amount of overtime contained in the latter average must have been at least two hours; in the average of 48·9 reached in 1955 it must have exceeded three.

So much overtime must, of course, be contributing to the rise in production, though not in proportion to the hours worked, for overtime work notoriously yields diminishing returns. But overtime work, while it yields less in proportion to production, adds more in proportion to demand, since the work-people earn high hourly rates.

It is curious that, whereas in the controversies about inflation and the balance of payments, the one point on which all agree has always been the desirability of more production, yet a direct result of the elimination of excessive overtime would be an actual *fall* in production. But the paradox, after all, is not so irrational, for the fall in production would be associated with a rise in productivity per man-hour. And overtime rates of pay give rise to a consumer demand which exceeds the additional output secured.

The acceleration principle applies to stock-held goods as well as to instrumental capital. When demand expands, traders seek to hold stocks in proportion to the additional demand. Their purchases on this account are additional to the purchases induced by the prospect of rising prices. If the speculative purchases were successfully quelled, would there be a danger of

the cessation of excessive overtime making traders' stocks redundant and causing a serious slackening of productive activity? That would, I think, hardly be possible consistently with a continuance of the under-valuation of the pound. The productive resources released would be fully employed in export trade and at home in competition with imports. Undoubtedly, if the pound were up-valued, that process ought to be applied gradually and cautiously.

Mr. Harrod (pp. 11–12) sees in the sudden increase in factory building in 1954–55 a delayed application of the acceleration principle, and he explains the delay in terms of the psychology of a representative entrepreneur. It would seem probable that the acceleration principle has been at work ever since the end of the War, for industry has all the time been feeling the strain of an excessive demand. But the resulting capital outlay has not necessarily been a contributory cause of inflation, at any rate, since the long-term rate of interest has been free to adapt itself.

Mr. Harrod remarks (p. 2) that Keynes did not make clear whether there might be equilibrium " if the propensity to invest, the rate of interest and the multiplier had values such that aggregate demand exceeded the supply potential." In Keynes's view the condition of equilibrium would be a rate of interest equal to the marginal efficiency of capital. He found in the " speculative motive " an obstacle to the rate falling below a limit determined by " what is considered a fairly *safe* level " (*General Theory*, p. 201), so that the rate " may fluctuate for decades about a level which is chronically too high for full employment " (p. 204). But he indicated no corresponding obstacle to a rise in the rate of interest. He held that the rate of interest is determined by the " conditions of credit," that is to say, the terms on which the banking system induces people " to sell the banks a debt or a bond in exchange for cash " (p. 200). But the practice of the monetary authority may be " to concentrate upon short-term debts and to leave the price of long-term debts to be influenced by belated and imperfect reactions from the price of short-term debts." That, of course, is what, according to his theory, the British banking system does.

When the object is to raise the rate of interest, the inducement the banks offer is not to sell " a debt or a bond in exchange for cash," but to abstain from selling, or to buy. They extinguish cash. Even if the banks concern themselves only with the short-term rate, and fail to check long-term investment, the increase in investment will generate through the multiplier an increase in incomes, which will absorb an increased amount of cash in the transactions balances (M_1), and the shrinkage in the surplus balances (M_2) will cause a further rise in the rate of interest.

I think that Keynes would have said that there is no obstacle in the way of a Bank Rate policy checking inflation, but that he would have qualified this conclusion by reference to the highly " psychological " or " conventional " character of the rate of interest, the vagaries of which the monetary authorities might find baffling.

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THE MYTH OF "FAIR" WAGES

THE periodic cycle of wage claims, amounting nowadays to an almost continuous process, has evoked a considerable amount of exhortation and advice. But the more copious the advice, the greater grows the confusion about what should be done. Not so long ago all analyses of wages were conducted in the most abstract manner, a manner which mainly ignored the social and psychological factors which make people behave as recognisable human beings. The present danger is of going to the other extreme and assuming that economic repercussions are of so little importance compared to social and ethical considerations that they need hardly be taken into account. On several occasions recently, for example, emphasis has been laid on the need to establish [1] "an authoritative and impartial body" to consider the whole complex of wage problems and "to give advice and guidance as to broad policy and possible action." The Chairman of the Trades Union Congress a year ago, in his presidential address, urged the setting up of an Arbitration Appeal Tribunal to act as a sort of House of Lords in settling disputes that resisted the existing arbitration machinery. The Royal Commission on the Civil Service insisted on the importance of establishing "fair" and "equitable" rates of pay; the Court of Enquiry into the railway dispute last year demanded "a fair and adequate" wage for railwaymen. These are but a few manifestations of a present tendency to look at wages from anything but an economic angle. Many of those who have stressed the need for new basic principles for the settlement of wages, or for impartial bodies to judge between rival claimants, seem to imply that present wages are more or less haphazard; that they have neither rhyme nor reason to explain them and are, indeed, solely the result of pressure-group activity within industry.

Two distinct but related questions call for attention. The first is: Are wages, in fact, so arbitrary and fortuitous as they are said to be by their critics? The second: Could we establish principles of remuneration on which wages might be so based as to commend them to current conceptions of justice and equity?

The "marginal productivity" theory on which most of us were brought up can be, and often is, stated in such a way as to provide an easy cockshy, but it is not as irrelevant to an understanding of movements in wage-rates as is often stated. In real life, of course, there is no irresistible force which equalises rates of pay for all work, whatever it is. Ability has not been doled out with such even-handed impartiality as that. We differ from one another in our innate capacities, and in a world in which the different jobs to be done need very different combinations of qualities, it follows that some

[1] Report of Court of Enquiry into Confederation of Shipbuilding and Engineering Unions, Command 9084, 1954, p. 48.

fortunate ones have more and rarer abilities than others. Even if there were perfect mobility, full knowledge of alternative occupations and absolute equality of opportunity to train whatever capacity an individual might possess, there would still be fewer people able to perform a delicate brain operation than to hoe turnips; and, as price reflects relative scarcity, different rates of pay would result. In the world as we know it, however, there is *not* perfect mobility, equality of opportunity and all the rest of it, and therefore the markets for these " differentiated products " have little connection with one another. Yet even so, they are not completely cut off from one another. The more skilful organisation of the labour market, with its network of communicating clearing houses, the wide diffusion of educational facilities and the increasing extent to which occupations are thrown open to the talents instead of being reserved for members of certain social groups, all increase the flow of human services into channels from which earlier they were blocked and this is, at least, *reflected* in the differences of pay they attract.

Equally, of course, it is not possible to isolate and measure the contribution of an individual worker, or even of a group of workers, to the productivity of a firm; nor are workers unaffected by social and psychological factors which hinder them from moving into or out of industries. But the difficulty of exact calculation does not mean that quantitative differences can be ignored. An employer may act on an estimate which would not satisfy a statistician; and though workers may be influenced by many other things than money, this does not mean that wages have no influence in their choice of jobs. Criticism of the far-fetched way in which theory has so often expressed the relationship between wages and the flow of labour is no excuse for throwing the baby away with the bath water and assuming that there is no relationship at all.

Nationalised industries may be permitted to act in a way that seems to put them above all economic considerations. But four-fifths of the economy is still in the hands of private enterprise, and as firms are compelled to keep their costs below selling prices if they wish to remain solvent, wages cannot be left out of their calculations. There is obviously a difference between industries in which labour costs represent a small proportion of the total (as in such very highly-mechanised forms of production as the manufacture of mineral waters or of industrial chemicals) and the general run of industries, in which the wages bill may be anything from 30 to 70% of the total cost of the product. The former can absorb increases in wages which would call for immediate readjustments in the latter: but even where wages are comparatively unimportant, changes *will* nevertheless be made as the wage bill goes up.

This is so obvious as to seem scarcely worth saying, but so much of the recent public discussion of wages has concentrated attention on wages as the reward for work rather than as an element in costs that this aspect is in danger of being overlooked. In a community such as ours, where 93% of the occupied population are employees of one sort or another, the social

implications of wages and salaries naturally loom extremely large. The pay we get not only determines the standard of living we can maintain but also acts as one of the principal agents in establishing our social status. It is this aspect of wages that is, naturally enough, the principal concern of the recipient. But this does not alter the fact that to the employer his wages bill is a cost that must be covered or else he must devise alternative ways of getting the goods produced and marketed.

The effect of a rise in wage-rates is not direct and immediate, and a business does not necessarily sack some of its workers when a wage goes up. It may recently have invested heavily in new equipment and be therefore unwilling to consider a change in techniques until this has had a reasonable run; or it may be willing to try to buy a period of freedom from industrial disputes by agreeing a wage that it thinks economically unsound. But unless the higher labour cost can be offset in some other way it must eventually be reflected in higher prices, and except where the market is feather-bedded by subsidies or guaranteed prices, or unless the demand is completely inelastic, the fall in consumption will mean a slackening in the demand for that particular type of worker. More often, however, the result of rising wages is a readier disposition to examine the possibility of producing the same product by alternative methods. Inventions are available for a long time before the stimulus becomes strong enough to try them out, and many new techniques are not adopted until the wage bill goads the employer to change. How rapidly a firm alters its estimate of the "worth-whileness" of its existing labour force depends on the readiness with which it receives new ideas; but that it will eventually try to economise on high-priced workers is not in doubt.

On the workers' side the estimate of "worth-whileness" is much more complicated, for it involves elements on which it is difficult to put a money value. If you have to make up your mind that one job is more attractive to you than another, you have to compare all that "goes with" each of them; and the things that "go with them" are continually altering with the changes that take place in social custom and social prestige. Dockers, even in the days when their earnings were much lower and more irregular than they are now, used often to refuse industrial jobs because they could not accustom themselves to working indoors on a rigid time schedule, and the post-war Dock Labour Scheme still finds the set day a difficult nut to crack; railway workers, before the War, accepted lower wages than they would have got in some other occupations into which they might have gone because they had regularity of pay and security of tenure, but now they complain that the relative lowness of pay remains whilst other occupations have caught up with them in security. At one time the white collar and clean hands of the office worker, with the right to be called Mr. X or Miss Y, acted as a lure to draw men and women into occupations that brought relatively low money rewards; and there is no doubt that many jobs attract people because of the higher social status that they believe them to confer. What causes one occupation to rank higher in social prestige than another? Who can tell?

There are, no doubt, some jobs that owe their higher rating to the high pay they offer and, in some cases, particularly where the occupation is a fairly new one and the rating not yet established, a deliberate attempt may be made to create prestige for it by establishing high salaries. (Presumably the recommendations of the Herbert Committee for higher salaries for the members of the Central Electricity Board must be of this type, for the net addition to the recipient after surtax would be negligible.) But in other cases, where the occupation has customarily been put high on the social scale, this is not so, and many types of work continue to have high prestige though the money income is modest. The clergyman is conventionally awarded a social status higher than that of workers in industry earning two or three times his income. He enters that profession presumably because of the non-monetary satisfactions he gains from it, and when he looks for an increase in pay it is not in order to raise the esteem in which his calling is held, but because even a man of God must pay his bills.

Prestige, regularity, chances of promotion, mental or spiritual satisfaction, leisure, access to particular social groups—there is no end to the things that " go with " a job and so influence people in deciding what to do. The trouble is that we often miss their significance for they are not as obvious as changes in money wages. We are still in the dark, for instance, in trying to estimate the importance workers attach to security of tenure in a country where there has been no unemployment for fifteen or sixteen years; or the extent to which, in money terms, week-end work or night shifts deter men and women from entering jobs that need them. Nor do we know whether the black-coated job still takes precedence and, if so by how much in weekly terms, now that there is so much greater uniformity in off-duty clothing and leisure-time activities amongst all social classes. We can conclude that men dislike the danger and discomfort of working underground from the fact that it is difficult to recruit them to the coal-mines, although earnings in the industry have gone up so much more proportionately than elsewhere; we know, too, that some men, even after serving their apprenticeship to a skilled trade, prefer to take semi-skilled work in order to earn more on piece rates. But just what is the quantitative expression of these factors we do not know. Very few people attempt to make anything approaching an exact calculation in their own minds of the various elements in jobs, but some estimate they must make, for the fact is, that men and women *do* move from one job to another, and presumably they do so after deciding, however hazily, that one job with all that goes with it—pay, security, prestige, leisure and so on—is more worth-while to them than the job they leave or don't go into.

It has been usual in some circles to pour scorn on this whole conception of the " choice of occupation " and its relationship to the occupational distribution of the population. What choice, it is rhetorically asked, is there open to a working man, ignorant of alternative possibilities, compelled to choose quickly or go hungry, with no resources behind him to enable him to train for a job in the future, circumscribed by the industrial specialisation

of the locality in which he happens to live and so on? Freedom of choice, indeed, is not absolute. We are limited, first of all, by our own capacity or lack of it; we are still further bound by the expense and difficulty of training what abilities we do possess. Even in these days of abundant educational facilities, it is much easier for a middle-class boy to fit himself for certain jobs than it is for the son of a labourer, whatever his native ability. But even the son of the labourer who fails to get or does not want a place in a grammar school is not bound to follow his father's footsteps—he can become a postman or a policeman, a docker or a soldier, a builder or a miner or enter any one of a dozen other occupations carried on within his area and open to one of his physique and capacity. Which he does actually go into—unless he is completely irresponsible, aimlessly floating as a bit of flotsam on the industrial waters—is decided by his own idea of which job is worth-while, whatever the elements in that worth-whileness that particularly attract him, whether it is more money, or more leisure, or anything else.

There are types of social organisation in which such decisions are unnecessary or prohibited. In a monastery, for example, there is no question of raising the reward attached to particular jobs or of luring men into them by other methods. The monks are under a vow of obedience and are bound to act as their superior orders them. Similarly, in the Israeli *kibbutz*, at the present time, all share equally in what is produced, irrespective of the task performed by each member, and men and women can be allocated to whatever job is considered most urgent at the moment. Here the members of the little community voluntarily surrender their freedom of choice for what they believe to be more valuable—a life in common based on friendly co-operation instead of competition. But it must be remembered that nobody is compelled to remain in the *kibbutz* if he comes to believe that the loss of freedom has been too dearly bought. At any time members can leave the settlement, and many do. Yet even here experience shows that there are certain types of work which are not voluntarily undertaken, and which are done so unwillingly by the members allocated to them, that many of the *kibbutzim* have now come to employ non-members for these jobs at market rates of pay.

This point has been stressed because it is important to face the fact squarely that, unless we are prepared to institute direct control of labour, there is literally no way at all of getting workers into some jobs and out of others except by the changes in these jobs' relative worth-whileness—the clumsy phrase I continue to use to make it clear that it includes all the factors that make one job more attractive than others as well as the actual money wage. It may go against the grain to speak of wages as a "price," because for so long—on humanitarian grounds—there has been a passionate revulsion against the concept of labour as a commodity to be bought and sold. But so long as people want to exercise freedom of choice in deciding what job to do and where to do it, a price is what, fundamentally, a wage is, performing the function of every other price—that is, of sign-posting resources into different channels of marketable value. However we try to

avoid using the term, we have to face the nature of the wage bargain, which means that we must recognise that basically it is determined by the movements of the market and not by ethical and social considerations.

It is often asserted that the spread of collective bargaining has completely altered the situation, and that wages now represent much more a social assessment than an economic compromise. It is true, of course, that the method of settling wage-rates is different when agreements are made on behalf of organised groups instead of between individuals, but this is no more than saying that the labour market is now one of monopolistic competition. A strong trade union can compel a particular rate to be fixed, as a monopoly firm can enforce minimum prices for its products; but neither can force the purchaser to buy, and both must face the possibility of unsold " stocks " if the price is fixed beyond what the market is prepared to pay for what is on offer. Collective bargaining has, indeed, introduced new elements into the wage bargain, but it has not materially altered its economic nature. There may be differences of opinion as to whether all these new elements are in the public interest, or, even, in the long-term interests of the members themselves, just as there may be divided views on how far such a system as Resale Price Maintenance is disadvantageous to the consumer. To say that wages are what they are primarily as a result of economic forces is not to say that the particular wages being paid at any time are the wisest and best that could be devised in the best of all possible worlds. It is an analysis and not a judgment. It points merely to the conclusion that present wage-rates are not entirely arbitrary nor entirely haphazard.

The economic basis of wages is obscured by the slowness with which changes in wage-rates operate on the supply of workers of different kinds. A man does not easily leave his job, even if alternative employments offer higher rates or greater amenities. An engineer cannot become a printer, any more than a lawyer can easily become a doctor. It takes time and money to acquire the necessary qualifications, and an adult can rarely afford to move. Having made his choice during adolescence, he must either stick to it and follow the fortunes of his trade, up or down, or else demote himself by taking semi-skilled work in some other occupation. Even in semi-skilled operations, familiarity with the materials and the machines counts a lot, and it takes a fair amount of provocation to persuade a worker to change. He is much more likely to do so if he loses his own job and has to look round for something else than he is if he hears of other work on offer at better pay.

When, as so often happens when areas have highly specialised industrial production, the alternative employment is in another district, movement from one industry to another is even more severely impeded. There are the hazards attached to giving up a house before being certain that another will be available; there is the natural dislike of uprooting oneself from familiar surroundings and leaving one's friends; or of upsetting a son or daughter happily settled at school or at work. All these things help to make a worker stay put in the district and occupation where he happens to be. Yet slowly

and jerkily the movement from one industry to another does in fact take place, as is evidenced by the rapidly altering figures attached to different occupations. The movement is partly brought about by the new recruits to employment, who are more likely to attach themselves to the trades whose prospects seem better; but adults also change when the higher earnings and general worth-whileness of other types of work are sufficiently attractive.

Government intervention in wage settlement recognises the "price" nature of the bargain, and in neither the Wages Councils nor the arbitration machinery is there any attempt to introduce any different foundation for wages than those that exist for voluntary agreements. Much criticism has been levelled recently at the Government for not laying down clearly the principles on which these bodies should base their recommendations, but such criticism shows a complete misunderstanding of what they were established to do. It has never been part of the intention that they should supersede voluntary negotiation and agreement between the parties concerned—the employers and workers in the industry. In fact, recourse to arbitration may not be made until all the voluntary procedures of negotiation have been fully explored; and, by statute, the Minister of Labour is prevented from setting up a Wage Council in any trade in which there seems any possibility of the development of effective voluntary organisation on the part of the workers themselves. In both cases the purpose is to get an agreement between employers and workers in circumstances in which such an agreement might not be possible without some outside assistance. The decisions of the Wages Councils are given legal sanction and enforced by a Government inspectorate simply because otherwise they might not be kept. When a trade union makes an agreement there is no need for it to be enforceable at law, because the union member can complain to his shop steward if he thinks he has been wrongly treated and the union can take the necessary steps. In an unorganised trade the workers are too ignorant of their rights or too afraid to demand them, and a Government inspectorate is therefore needed. But in the fixing of the rates exactly the same considerations are taken into account as would be taken by workers and employers if they were sufficiently well organised to be able to carry on their negotiations unaided. In fact, Wage Councils are simply statutory collective bargaining.

Similarly, the arbitration machinery is a part of the voluntary negotiation of wages, and this characteristic is continually underlined. A wage is a contract between two interested parties, and whenever a contract has to be settled between two individuals or two groups of people whose interests are not entirely identical some compromise is the only solution. It is because this is recognised that there has always been such opposition to any suggestion that arbitration should be compulsory with legally enforceable awards. If a compromise has to be effected it must be what each party believes to be, if not all that was hoped for, then at least a reasonable part of it. But what is unreasonable? or reasonable? What "ought" to be the differential between skilled and unskilled workers? What "ought" to be the "right" working day? How far "ought" the standard of living to be a determining factor

in a wage-rate? Whose standard is to be the measuring-rod? We have only to ask these questions to see what a volume and variety of answers they must evolve. A judge in a court of law is not asked to formulate moral principles; he is asked to administer the law. The principles have been already agreed either by statute or by common law, and all he has to do is to apply them to the particular situation with which he has to deal. He is an interpreter of laws, not a law-maker. But in the face of the complete lack of any body of agreed principles on all the matters in which industrial disputes take place, a compulsory arbitrator would be in the position of a one-man Parliament, not a judge.

Compulsory arbitration was successful during the War for two reasons. First, it was instituted by common consent. Both employers and employed agreed to give up the voluntary method for the period of emergency because other things were more important. Secondly, there was no legal freedom of choice of occupation during the War. The Minister of Labour could allocate man-power according to national needs, and, therefore, could if he wished lay down the conditions of employment.

Voluntary arbitration is successful because the disputants are simply expressing their willingness to accept a compromise if a reasonable one can be suggested to them. Rather than the suffering and expense of a stoppage, each side takes the risk of getting a little less than it might have got after a fight and has the hope that it might get a little more than it would have been forced to agree to.

This brings me to the second question I put myself. Could we establish principles on which such rates could be based as would commend themselves to the current conception of justice and equity? In the recent report of the Royal Commission on the Civil Service there is a valiant, but unsuccessful attempt to do just this for the pay of Civil Servants. The Report quotes disapprovingly a statement made by an earlier committee to which this matter had been referred.[1] "In our view there is only one principle in which all the factors of responsibility, cost of living, marriage, social position, etc., are included—the employer should pay what is necessary to recruit and retain an efficient staff."[2] In its criticism of this statement the Report argues: (1) that financial considerations are not the sole nor necessarily even the principal motives that attract men into the Service; (2) that wastage is not a reliable indicator of fairness or unfairness, because specialists cannot always move to another field, and (3) that it is very difficult to assess "efficiency," since a sense of grievance may lead to a slow deterioration impossible to measure. In none of these respects, however, is the Civil Service different from other fields of employment. People go into other jobs because of family tradition, interest in the work and desire to serve their fellow men; difficulty of movement affects anybody with specialised qualifications, and the work of even unskilled labourers is affected by their contentment or lack of it. And indeed, after a lot of discussion leading nowhere,

[1] Royal Commission on the Civil Service 1953–55, Command 9613, 1955, p. 18.
[2] Interim Report of Court of Enquiry into N.U.R. Dispute, Command 9352, 1955, p. 6.

all that the Report can do is to say that justice is established if Civil Service rates bear a "fair comparison" with those paid to people with similar qualifications doing similar work in other occupations. If this is not what the framers of the earlier principle meant, what else could it have been? After pages of argument designed to get away from what seems so coldly economic, there they are back again at the point from which they started.

A much more disastrous attempt to establish a "right" basis for wages was made by the Court of Enquiry into the dispute between the British Transport Commission and the N.U.R. in January 1955.

> "We feel" [said the Report] "that we must state in the plainest of terms what we apprehend to be the proper approach. The Nation has provided by statute that there shall be a nationalised system of railway transport which must therefore be regarded as a public utility of the first importance. Having willed the ends the Nation must will the means. This implies that employees of such a national service should receive a fair and adequate wage and that in broad terms the railwayman should be in no worse case than his colleague in a comparable industry."

This is one of the most inept statements ever delivered by a responsible body. What do these portentous phrases signify? What is a comparable industry to the railway? and why? And who is the railwayman's colleague in such an industry? Many railwaymen live along the line in villages and country towns. Is it, then, the agricultural worker with whose standard of living his should be compared? Or, if he lives in a mining community, with a miner's? Or is the comparable industry road haulage, or aircraft or what? If the comparison is to be made on the basis of skill, how does one assess the hierarchy of skill? Is a doctor more skilled than a lawyer? Is the railway driver more skilled than the miner or the mechanic? What is the scale by which one measures these different skills? Is it the time taken in training? But the craft apprentice takes almost as long as the doctor to train; and in many jobs, such as industrial management, the highest skill is attainable only through experience on the job. Is the touchstone to be the responsibility involved? But how, again, can this be assessed? A surgeon, however skilled he may be, can kill only one man at a time; but the express-train driver can kill hundreds at once. Does this mean that his "fair and adequate" wage should be higher than the surgeon's? There has been much discussion recently of the shortage of science masters in grammar schools caused by the higher pay offered by Goverment Departments and by industry. Which is the comparable industry, and who is the science master's colleague to whose pay his remuneration should be allied? Is it the amount earned by a scientist in industry, or is it the scale paid to the English and Classics masters in the same school? All manner of devices are now being discussed to enable Education Authorities to pay more to science masters without seeming to do so, but this is economic compulsion and not a new interpretation of justice.

The trouble is that when we talk, as we so often do, of comparable occu-

pations and comparable skills, we are thinking backwards. We know that over a considerable period of time certain kinds of work have afforded similar standards of living to those employed in them and have, on the whole, recruited their workers from the same or closely related social groups; and it is this knowledge which makes us class them together. We argue from the pay back to the industry and the skill, and not the other way round. So that when big changes take place in the relative demands for these different kinds of work and their customary relationship is disturbed, there is anger and resentment on the part of those who find themselves losing ground. Quite aside from the adequacy or otherwise of their earnings to maintain their accustomed pattern of expenditure, they feel that their social status is in danger.

The large part played by differentials in recent wage disputes is indicative of the uneasiness which so many groups of workers feel in a world in which long-standing customary relationships have been rapidly changed by factors which have hardly been noticed until the full force of their effect suddenly makes its impact felt. Professor Phelps Brown, in a recent article, gives evidence to show that the differentials in the building industry probably remained unchanged from Agincourt to the First World War. During all that time unskilled rates were from 50 to 60% of skilled rates. But from then there has been a sudden and rapid alteration, until nowadays the rates are about 85% of the skilled. The Oxford Institute of Statistics shows that building is not alone in this respect; but that exactly the same thing has been happening in shipbuilding and engineering, though, of course, here the earlier rate has not such a long history behind it.

Three factors can be distinguished as co-operating to bring about the new situation. (1) Two world wars in which the whole man-power of the community was mobilised put labour, as such, irrespective of its skills, at a premium. Many more proportionately of the skilled workers than of the unskilled were kept out of the Forces, and the consequent shortage of semi-skilled and unskilled workers caused their wages to rise more rapidly than those of the skilled. (2) The fall in the value of money has led to constant demands to keep real wages steady. For many years these demands were made in the form of a claim for a flat increase all round and this, obviously, meant a higher percentage increase to the lower-paid workers. Moreover, when the White Paper on Personal Incomes was published, Sir Stafford Cripps in urging trade unions to observe the wage freeze made an exception on compassionate grounds in favour of the lowest-paid groups, for whom increases might still be permissible. During the years, then, in which the wage freeze operated to restrain the upward surge of wages for the better-off workers it sanctioned rises for the lower paid, composed largely, though not entirely, of the unskilled. (3) Perhaps the most potent factor, however, in narrowing differentials has been the growth of the giant amalgamated trade union—the outstanding characteristic of modern trade unionism. The number of separate unions has decreased whilst the membership has greatly increased, and the most powerful unions, those which set the pace for

the others, have a very varied membership covering a very wide range of skills and occupations. In theory there is no compulsion on a union to make a claim on behalf of all its members at once; but in practice it is very difficult to avoid doing so. Thus the narrow differentials that developed as a result of the other two factors have become established by the overall union demand. Which of these differentials is the right one from the social or moral standpoint—the old one or the new?

The difficulty of introducing social and ethical considerations into wage-rates has long been illustrated by the problem the trade unions set themselves over a hundred years ago, and to which they have still not found a solution—the reconciliation between two objectives that are mutually incompatible. On the one hand, experience soon showed them that protection for the individual could be obtained only through the strict enforcement of an occupational rate; on the other their social aspirations led them to demand a "living wage"—one based, that is, on the needs of the worker as citizen, husband and father. But there is nothing which necessarily brings these two into line with one another. Not only do the worker's needs vary according to the size of the family he has to maintain, but there is also no reason to suppose that the needs of the skilled worker are higher than those of the unskilled. In fact, one might argue exactly the opposite, for even with the general fall in the birth-rate, the average size of the family amongst unskilled labourers is, according to the 1951 Census, 40% larger than that usual amongst the skilled. No trade union, however, has yet argued that unskilled wages should be higher than skilled, and if it did it would soon lose its skilled members. The skilled worker thinks he "ought" to get more because he is "worth" more—not presumably as a man or a citizen, but as an economic asset to the firm, and he points out that unless he does get more the flow of skilled workers will soon dry up. We come back to the same point again.

This insistence on the essential nature of a wage as a price and not an expression of social or moral sentiments might lead to the belief that the State must stand aside from all wage settlement and leave economic forces to "do their worst." But this does not follow. In the contemporary climate of opinion it is agreed that the State has a duty to protect the welfare of its members, and that it must ensure that the social structure, within which economic forces are permitted to work, should commend itself to the conscience of the community. It can, for example, lay down a minimum standard of pay below which no person could be employed; and, in effect, it does this by the maintenance of unemployment insurance benefit. It can recognise that there are labour markets in which the difficulties of organisation put the workers in a peculiarly vulnerable position and that some supervision of the wage bargain is necessary if the strong are to be prevented from exploiting the weak. Again it can provide as generously as it likes the facilities to enable everybody to develop to the full whatever abilities they possess and thus fit themselves to seek occupations into which they might otherwise not have been able to go. It might even decide that there are certain types of work which are socially valuable into which people go for

reasons which are so preponderantly non-financial that certain rates of pay must be enforced in order to ensure that the people in them are able to carry on their work without starving themselves or their families; for example, the Church might be considered one such field of employment. I myself am not suggesting that this is so, but giving it simply as one illustration. Such actions as these do not try to establish a moral basis for wage-rates; they recognise them for what they are—a contract between two persons or groups of persons in which each is primarily concerned with safeguarding his own interest. What they do is make sure that neither side can take advantage of the other by superior knowledge or by superior resources.

It is ironic that the keen desire to find some social foundation for wages has grown stronger just at the time that it is least justified. Uneasiness about " wages as a price " derives primarily from the recognition that the wage-earner is responsible for more than his own welfare. As the father of a family, the ups and downs of his economic fortune have lasting influence on the health and education of the next generation. It is this double aspect of wages—the economic face looking towards costs of production and the other towards standards of living—that has produced in trade unions an ambivalence which makes them assert, on the one hand, that the wage should be recognised as the basis of the standard of living and, on the other, as the occupational rate irrespective of the circumstances of the individual worker.

The unions tried to ignore this dilemma by assuming the existence of a typical, or standard, or average family. By and large, they argued, most men have similar responsibilities, and for some reason these come to be summed up as the upkeep of a wife and three dependent children. Nobody asked whether this size of family was indeed typical, but the figure was so widely accepted that it became the unit that continually figured without question in discussions of the adequacy of wages. It was Eleanor Rathbone who first pointed out that at any one time only 8·8% of the men then at work actually had three children dependent on them and that if wages had been based on the amount it cost to provide for a wife and three children, they would have provided for 16 million phantom children that did not exist in the families with less than three, whilst failing to provide for over one and a quarter million real children in the larger families.

Since the survey in which this calculation was made the size of the family has shrunk further, and the typical family that now figures so largely in wage discussions is generally taken as consisting of two dependent children. But this typical family is as much a myth now as the larger one was then. According to the Family Census taken for the Royal Commission on Population in 1945, the modal family is now just over two instead of the five of the late nineteenth century. But not all these children are dependent throughout a man's working life. In more than 80% of families the family is completed within the first ten years of marriage. If then we take a period of three years as separating the births of the two children and re-

member that the school-leaving age is fifteen we can see that the total period during which the father has dependent children to maintain is no more than eighteen years out of a total working life of half a century (fifteen to sixty-five). This is confirmed by the analysis of households and earners in the Census of 1951. Of the 14½ million separate households in this country 56% had no children at all under sixteen years of age, and 21·5% had only one. But 2 million of these households consisted of people with no earners in them—that is, they were all either unoccupied or had retired, so these should be left out of the present discussion. Mr. Brennan has analysed the households with an "occupied" head to see how many dependants each had. In many households the man is no longer the sole breadwinner. The small family has freed wives from full-time domestic duties, for it is now for only a comparatively short period that there are young children to be looked after. Between the ages of thirty and fifty about two-thirds of all women employed are married. In fact, there are now only one in every six households in which there is only one earner and dependent children, and only one in three [1] which have only one earner and any dependant at all, child or adult; 46% of all households with an "occupied" head have two or more earners, and only 22% have as many as two dependent children with only one earner. This means that at any time 78% of those who are affected by wage negotiations have not got the family responsibilities which are assumed by the negotiators. In fact, the old-established unit of "bread-winner and dependent family" has disappeared as the typical family structure.

There is, moreover, another, and even more important, respect in which the situation has changed. In the last century the standard of living of the family was almost completely dependent on the earnings of the father, for unless they were close to destitution, there was no social provision on which they could rely. Since then there has been a social revolution, and the father of a family is no longer its sole support; the State has gone into partnership with him. Consider the part played by the State in the maintenance of the family. Last year the average earnings of adult men in industry were about £10 a week. A married man with two children earning £500 a year, at the rates of income tax then ruling, paid no direct tax at all; a bachelor with the same earnings paid £112. In addition, family allowances, free medical attention, free education up to whatever level the children's abilities can take them, subsidised housing and food, all ease the burden on the family man. Young children are not the only dependants; elderly parents have to be cared for. Here, too, the State has relieved the breadwinner by the provision of retirement pensions. What, indeed, we have done in the last couple of decades is to provide a new basis for standards of living. Members of the community—individuals or families—no longer have to adjust their standards of living to their earnings. Society provides a "social income" which bears no relationship to earning power and, unlike

[1] T. Brennan, "Household Structure and Family Income," *Scottish Journal of Political Economy*, June 1955.

wages, has no difficulty in adjusting itself to varying needs. It is not pretended that this social income now puts the family man on the same footing as the bachelor or the childless couple, but it could do so. We have devised a method which could be developed as far as the conscience of the community directs without bringing about those distortions of the economy created by wholesale wage movements. It used to be said that the British Empire was created in a fit of absent-mindedness. It could, perhaps, be said with more truth that we have created, by inadvertence, the way out of the dilemma of " wages—needs or productivity? " Most of us during the last twenty or thirty years have been split personalities—with one half of our minds recognising the economic function of wages and the other half trying to devise ways and means for developing a more secure and more equal community. Perhaps a clearer realisation of the power we possess to procure the latter by other means than individual earnings may make us more ready to leave wages alone to do their proper job.

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THE SUPPLY FACTOR IN PROFESSOR HICKS' THEORY OF THE CYCLE[1]

MANY modern writers on income fluctuation show a distinct bias of interest towards the factors affecting demand. Perhaps it is the current disenchantment with the theory of the firm that explains this as much as the influence of Keynes. The comparative neglect of the supply side, however, in Keynesian economics, has provoked a recent controversy around an article by Mr. de Jong[2]; and it is in the hope of being in on a growing fashion that this paper sets out to consider the supply side of the particular element of the post-Keynesian school of trade-cycle theories represented by Professor Hicks. It is concerned less with the substance of Professor Hicks' theory than with its formulation—no new nails are forged for the coffin of the acceleration principle, for example; but the general conclusion is that when it is reformulated to take explicit account of the supply factor it is less easy to accept its fundamental contention that the economic system is naturally unstable and caused to exhibit, by collision with external restraints, the limited oscillations observable in the real world. The analysis falls into three parts. First, the implicit supply assumptions of Professor Hicks are brought out. Secondly, some criticism is made of these assumptions. And finally, a more general model is presented in which the influence of the supply factor is analysed.

For Hicks, consumption demand in any period t is a constant proportion of output (regarded as identical with income) in the previous period. Investment demand is divided into two parts; some is induced and is a constant proportion of the change in output between the previous period and the period before that, and some is autonomous. Aggregate demand in period t can thus be symbolically stated as:

$$D_t = A_t + cY_{t-1} + v(Y_{t-1} - Y_{t-2}) \quad . \quad . \quad . \quad . \quad (1)$$

Now Hicks nowhere writes down an expression which he calls aggregate demand. But the elements which compose the right-hand side of (1) must surely be interpreted as demands of one sort or another, and their sum as aggregate demand. We may begin work on the expression, as Mr. Harrod does on its equivalent in his dynamic model, by asking about the conditions of equilibrium, or equality between demand and supply, in period t. Let us suppose, then, that equilibrium exists in period t, and see what follows. Putting $Y_t = D_t$, we have:

$$Y_t = A_t + cY_{t-1} + v(Y_{t-1} - Y_{t-2}) \quad . \quad . \quad . \quad . \quad (2)$$

But this is curious. For Hicks plainly regards this equation, not as stating something about the conditions of equilibrium in period t between demand

[1] I am most grateful to Mr. G. D. N. Worswick and Professor Hicks in particular for valuable comment and suggestions.

[2] ECONOMIC JOURNAL, March 1954 and September 1955.

and supply, but as describing the actual behaviour of output.[1] He is meaning to tell us that given certain values of A_t, Y_{t-1}, Y_{t-2}, c and v, then we can deduce, not what output of the current period *must* be if it is to be exactly equal to demand, but what output of the current period actually *will* be. Yet he has told us nothing so far about what determines output in period t; our sole information, contained in equation (1), is about what determines demand. Or is it perhaps that in writing $Y_t = D_t$, and thus arriving at equation (2), he is not meaning to assume that equilibrium exists for the purpose of studying its implications, but is actually setting up an equation intended to describe how supply is determined? He is, of course, perfectly at liberty to use a supply equation of the form $Y_t = D_t$; its interpretation is simply that in each period output accommodates itself exactly to demand. Whatever is demanded is supplied. It is in fact an inverted form of Say's Law; " demand creates its own supply." In order to see more clearly what it amounts to, let us provide Hicks' model with an explicit form of supply equation:

$$Y_t = (1 + A)Y_{t-1} + \alpha(D_t - Y_t) \quad . \quad . \quad . \quad . \quad (3)$$

What is the interpretation of (3)? It is that there are two elements which determine output in any period. First, there is the element of secular growth represented by A and determined by factors which are for the most part exogenous, such as the rate of growth of technical knowledge. Secondly, there is the endogenous element representing the adjustment of output which entrepreneurs will make to situations of excess supply or excess demand, and α is a positive coefficient whose size measures the readiness of entrepreneurs to vary their output away from its secular trend for this purpose. Whether this adjustment occurs through the medium of the price mechanism or in some other way we need not now decide. All that we postulate is that if excess demand exists, entrepreneurs speed up the rate of growth of output above the secular rate A, and if demand is deficient they keep it below. Combining this explicit statement of the supply conditions (3) with Hicks' description of demand, his system becomes:

$$\left.\begin{aligned} D_t &= A_t + cY_{t-1} + v(Y_{t-1} - Y_{t-2}) \\ Y_t &= (1 + A)Y_{t-1} + \alpha(D_t - Y_t) \end{aligned}\right\} . \quad . \quad . \quad . \quad (4)$$

Evidently Hicks' special supply assumption is that

$$\alpha = \infty ;$$

for in this case the second equation reduces to

$$Y_t = D_t$$

and substituting for D_t in the first equation we obtain Hicks' description of the actual behaviour of output, (2) above, which originally aroused our curiosity.

It appears, then, that implied in Hicks' argument is the assumption that

[1] See *A Contribution to the Theory of the Trade Cycle*, Mathematical Appendix, p. 183, equation 17.1.

output responds to an emerging disequilibrium between demand and supply with such alacrity that it eliminates the disequilibrium entirely within the period in which it appears. This prompts the question whether anything is known empirically which would enable us to judge whether this type of response is in normal circumstances [1] likely. We cannot attempt any comprehensive review of the evidence, but there is some which can be adduced in favour of Hicks' implied view. In the first place, a number of statistical cost studies have been done, of which it has been said that " one striking finding . . . has been the apparent linearity, over wide ranges of output, of the short-run total production cost functions of observed firms, implying a constant short-run average variable and marginal cost except at extremely small or large outputs." [2] Where the short-run marginal-cost curve is flat, entrepreneurs whose aim is to maximise profits will adjust their output to the full extent required by lateral movements of the demand curve facing them, without any need to quote a different price. (This is illustrated in Fig. 1.) For those who prefer their entrepreneurs decontaminated of the suspicion that their paramount aim is to maximise profits, we can offer the evidence of Messrs. Hall and Hitch's witnesses and their " full cost principle." [3] The business-men questioned in this study displayed a reluctance to alter the price they had fixed for their product on the basis of full cost, and a willingness in the short run to sell whatever might be demanded at that price, accepting with a good grace whatever variations that might involve in their profit margin compared with its expected level. One suspects, however, that stoicism such as this must be contingent upon the costliness of meeting fluctuations in demand. Under the conditions of Fig. 2, for example, where short-run average costs rise steeply either side of their minimum, not only unexpectedly low profits but actual losses would be experienced if comparatively small movements in the quantity demanded at each price were fully met. It could still be true that as a matter of fact entrepreneurs were willing for other reasons to bear such losses. But adherence to the " full-cost principle " strongly suggests that the conditions of production must be very different from those of Fig. 2 and such as to make it a matter of indifference, as far as the profit margin is concerned, what output is produced; must be in other words conditions approaching constancy of the short-run average cost curve. Thus the " full-cost principle " seems to support the statistical findings already mentioned, and both sets of evidence appear favourable to Hicks' assumption that in the short run supply accommodates itself freely to demand.

[1] That is to say, before the cycle has really got under way. Once this has happened we should expect to find supply reactions changing. For example, as the boom progressed, supply would become more and more inflexible. This is allowed for by Hicks, and is an integral part of his explanation of the downturn. But we are concerned now with the question whether, with entrepreneurs behaving normally, the system is nevertheless unstable.

[2] *A Survey of Contemporary Economics*, Vol. 1 (ed. Howard Ellis), pp. 140–1. The contributor of this chapter on Price and Production Policies, Joe S. Bain, also claims that " the better cost analyses . . . have defended their findings rather well " against statistical criticisms.

[3] R. L. Hall and C. J. Hitch, " Price Theory and Business Behaviour," *Oxford Economic Papers*, no. 2, May 1939, pp. 12–45.

But when we study this supply assumption, not for its factual validity, but in the context of Hicks' complete model, we are involved in a serious logical difficulty. It is curious to find it in the same bed as the acceleration principle. For the acceleration principle itself has supply implications of the opposite kind. It tells us that entrepreneurs make their investment decisions in such a way as to preserve a constant ratio between capital and output. Why should they be so much concerned about this ratio? Presumably because their capital equipment has a certain closely defined capacity, and to operate at any other ratio (if indeed it is technically possible) seriously inflates their costs. Their short-run cost situation presents a picture of a very steep-sided and narrow-based U, like Fig. 2. Increases in the output of their existing plant are costly, and only if disequilibrium between supply and demand involves a substantial increase in price will they be worth while.

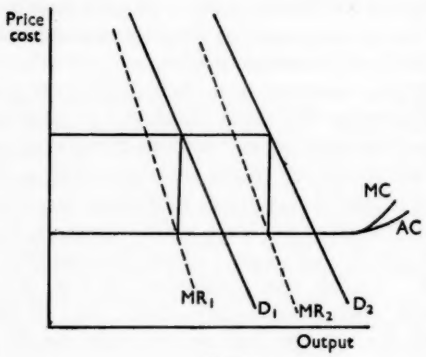

FIG. 1

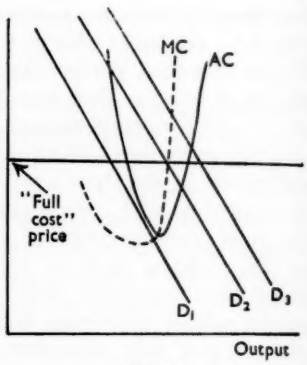

FIG. 2

More output requires more plant; and whatever may be the case in the long run when plant has been expanded to the appropriate size, in the short run output is very inelastic. Thus the acceleration principle carries its own armoury of supply assumptions. It is therefore very odd to find side by side with it in the same theory an assumption about supply which appears to involve very different considerations; an assumption that supply is extremely elastic in the short period, accommodating itself exactly to demand by the time the period is finished. In one place we find the notion that supply in the short period will respond only if there is a large price rise to induce entrepreneurs to bear the formidable costs of overworking capacity; [1] in another the idea that supply in the short period responds fully to demand, and consequently obviates any necessity for a price rise. Inadvertently, through failure to make the supply side of his theory explicit, Hicks has fallen into inconsistency. His theory of investment demand, the accelerator theory, is based

[1] To the extent that price rises are relied upon, in the conditions of inflexible capacity assumed by the acceleration principle, to achieve short-run equilibrium between demand and supply, the assumption of a constant c must come under suspicion.

upon a view of the conditions under which production is taking place which is implicitly denied in the process of arriving at the " basic equation " (2) purporting to describe the path of output.

Let us examine Hicks' supply assumption a little further. There is no reason why we should not at the same time assume perfect elasticity of supply in the *long run* and (as the acceleration principle demands) an exceedingly low elasticity in the short. Once enough time has elapsed for investment or disinvestment to restore the " correct " relation between capacity and output, it may be possible for entrepreneurs to meet a higher level of demand without any rise in average or marginal costs; there may be constant returns to scale. But Hicks' assumption obviously relates to the short run.[1] There are, however, other circumstances in which it might claim consistency with the acceleration principle; and these are the circumstances of the very short run. In the very short run changes in demand may be met by running down or accumulating stocks. Let us here make the distinction, which we have hitherto left blurred, between output and supplies. A firm produces a certain output; but this may differ from the amount that it supplies to the market to the extent that it is prepared to accommodate a shortage by relinquishing stocks or a glut by accumulating them. Supplies (Y_t') and output (Y_t) will be related to each other thus:

$$Y_t' = Y_t + u_t$$

where u_t represents the accommodating [2] accumulation or decumulation of stocks. Having introduced this distinction, it becomes possible to say that although output may be as inflexible as the acceleration principle assumes, supplies may still have infinite elasticity through the medium of changes in stocks. Explicitly, our output and supply equations may take the form:

$$Y_t = (1 + A)Y_{t-1} + \alpha(D_t - Y_t)$$
$$u_t = \beta(D_t - Y_t')$$

and to make the assumption that $\beta = \infty$ need not involve a clash with the acceleration principle. But although the introduction of stock changes embellishes the model, it does not resolve the fundamental difficulty. We must, after all, make some assumption about the way in which output as well as supply responds to a disequilibrium; and if we are committed already to the acceleration principle, we are compelled to assume that output is comparatively unresponsive, or, in the symbols of (3) above, that α is small.

It is possible, however, that we can resolve the apparent inconsistency between Hicks' supply assumption and the acceleration principle if we interpret the latter to mean that entrepreneurs keep a constant ratio, not between output and capital *in use*, but between output and *total* capital; and

[1] Perfect long-run adjustment of supply to demand would be expressed by a supply equation of the type $Y_{t+n} = D_t$, where n represents the gestation period of the requisite additional capital. But this would not lead us, combined with (1), to Hicks' " basic equation."

[2] As distinguished from its autonomous counterpart, *i.e.*, stockbuilding (positive or negative) decided on independently of the emergence of market disequilibria.

that these two differ because they like to keep some reserve capacity.[1] If we suppose this, we can at the same time maintain without inconsistency:

(*a*) that supply accommodates itself fully to demand in the short run by using up reserve capacity; and

(*b*) that investment demand behaves according to the acceleration principle in the sense that total capital is expanded so as to preserve its original ratio to output and the original degree of reserve capacity.

This line of escape from the apparent inconsistency between the Hicksian supply assumption and the acceleration principle depends upon the concept of reserve capacity. There is some evidence that this is something that entrepreneurs like to have.[2] But one suspects that it is something which they like to have, not for its own sake, but for use on occasions. One such occasion would be a sudden upsurge of demand. Reserve capacity now comes into its own; it smartly supplies the goods and saves, perhaps enhances, the entrepreneur's reputation. But does this mean that the entrepreneur is now worried by the fact that he has no longer any reserve capacity, and plans to expand his plant in order to restore the original ratio of output to total capital and thereby the original percentage of reserve capacity? To behave, in other words, according to the acceleration principle as now interpreted? The answer to this depends upon the considerations which influence the entrepreneur's decision why and how much reserve should be held. To the extent that the reserve is designed to cope with fluctuations in demand of the type normally experienced in the cycle, there is no reason why the fact that it is successfully doing so should set in motion investment plans intended to restore the normal ratio of capital to output, and thereby the normal percentage of reserve capacity. The reserve is in this case a form of insurance whose purpose is to obviate the need to adjust capital when output changes. It is therefore a reason why entrepreneurs should *not* behave according to the acceleration principle. It may be that if there were no reserve, it would be necessary for them so to behave; and this may be a reason why they are anxious to keep one. But once they have decided to keep a reserve of capacity capable of meeting normal fluctuations in demand, they have no need to make short-run adjustments of their capital stock, and the acceleration principle disappears. Thus to maintain at the same time that entrepreneurs are able from their reserve capacity fully to meet changes in demand, and that they frame their investment plans accelerator-wise for the purpose of restoring the reserve, seems to envisage that the purpose for which the reserve is held is something other than that of accommodating normal fluctuations. It seems to imply that when a boom gets under way and brings the reserve capacity into operation, entrepreneurs do not congratulate themselves that the expected is now happening, but are anxious lest the unexpected should catch them without room to manœuvre. This gives them a reason to re-create the reserve which has been swallowed up in meet-

[1] I owe this point to Mr. Worswick.

[2] See J. Steindl, *Maturity and Stagnation in American Capitalism*, pp. 9–14.

ing the increased demand, and so to be obedient to the acceleration principle. If, then, we are to use the "reserve capacity" argument to remove the inconsistency suspected of Hicks' model, we have to assert that the purpose for which the reserve is held is that of meeting unforeseen and abnormal changes in demand, whose possibility is always present at every phase of the cycle.[1] The argument would amount to the following propositions:

(*a*) output is elastic in the short run because reserve capacity is available;

(*b*) but this reserve capacity is something which entrepreneurs *always* wish to have;

(*c*) consequently the use of reserve capacity in meeting short-run changes in demand is not something which entrepreneurs are willing to accept as the justification for its existence, but leads to investment intended to restore the original percentage of reserve capacity.

Thus it is logically possible to achieve consistency between Hicks' special supply assumption and the acceleration principle. But it is quite a struggle, and by the time it has been won the system is in danger of becoming almost Ptolemaic. A simpler course would be to relax his assumptions, and this will shortly be done.

Thus far we have shown that Hicks' model, although explicitly stated on the demand side, makes certain implicit assumptions about supply. Let us now in place of Hicks' original model consider one which includes explicit assumptions about supply:

$$\text{(i) Demand equation:}\quad D_t = A_t + cY_{t-1} + v(Y_{t-1} - Y_{t-2})$$

$$\text{(ii) Supply equations:}\quad \left.\begin{aligned} Y_t' &= Y_t + u_t \\ Y_t &= (1 + A)Y_{t-1} + \alpha(D_t - Y_t) \\ u_t &= \beta(D_t - Y_t') \end{aligned}\right\}. \quad . \quad (5)$$

As before, Y_t' represents supplies, Y_t represents output and u_t represents the accommodating movement of stocks which links the two. Hicks' special case is that in which both β and α are equal to infinity, the latter (but not the former) being an assumption which takes some reconciling with the acceleration principle. But once the nature of Hicks' assumption is clear, we are led into some confusion in the subsequent stages of his analysis. Having obtained the actual path of the system, which he does by substituting his special supply assumption $Y_t = D_t$ into the demand equation of (5) above, so as to find that:

$$Y_t = A_t + cY_{t-1} + v(Y_{t-1} - Y_{t-2})$$

he casts around for some equilibrium path with which to compare it; and he yields to the temptation to identify equilibrium with a condition of steady growth. But the special supply assumption that he makes means that the

[1] Among such abnormal changes we would include, of course, changes occurring during the normal course of the cycle, which are nevertheless abnormally large or small compared to what would be expected at that particular phase of the cycle.

system is in equilibrium *all the time*, whether it is following a path of steady growth or not, in the sense that in each period supply adjusts itself to demand. Its actual path *is* an equilibrium path. Demand and supply are equal all the time because this is enforced by the supply conditions assumed to obtain. Under these conditions, therefore, it is meaningless to inquire into "the possibility of equilibrium"; disequilibrium is impossible.[1] What, then, is in Hicks' mind when he makes the inquiry? The question that he should really be asking is, "Under what conditions would a system, which always maintains itself in equilibrium, move along a path of steady growth?" Given his supply assumption, it is quite improper for Hicks to identify equilibrium with a condition of steady growth and to deny the description to other modes of the system's behaviour. But once we abandon this assumption it is perfectly proper to inquire into the possibility of equilibrium; for disequilibrium is no longer ruled out.

Let us, then, make this inquiry of our system (5). We will first make the simplifying assumption that $\beta = \infty$.[2] If there is equilibrium, the system reduces, by setting Y_t equal to D_t, to:

$$Y_t = A_t + cY_{t-1} + v(Y_{t-1} - Y_{t-2})$$
$$Y_t = (1 + A)Y_{t-1}$$

These are the conditions of equilibrium. How do we interpret them? The second condition signifies that if the system is in equilibrium it must be following some path of steady growth.[3] The first condition is more complex.

[1] Of course we cannot deny Hicks the right to use the term equilibrium to mean something other than that supply equals demand. He writes: "I think that my use of this term is open to criticism, though I would not put the criticism in just the way you do. Since I treated $D = y$ always, I didn't need to use 'equilibrium' in the supply and demand sense. Consequently I had it free for other uses. There is continuity between these uses and some of the regular uses; the stationary state is still an equilibrium even in my sense. And there is continuity with the use of the term in Newtonian dynamics. Nevertheless, I have often wished that I had used some other word."

[2] It is useful to make this assumption, and retain it throughout the rest of this paper, for another reason. Since our purpose is to examine Hicks' system, we must retain the acceleration principle. But if we do this, we must also assume that output is inflexible in the short run. There then arises the question: "If output will not respond fully to demand, what is the mechanism by which the two are equated in the short run?" If we answer "flexible prices," we can hardly continue to assume a constant c. But if we allow the short-run disequilibrium to be fully absorbed by accommodating stock changes (*i.e.*, let $\beta = \infty$), we are relieved from taking account of any disturbances through the price system. Or are we forgetting that stocks have to be financed, so that their accommodating variations may disturb interest rates? I do not think that this need worry us. Since interest rates are entirely immobile in Hicks' theory, he must have already paralysed them with the assumption that the supply of money is also infinitely elastic.

[3] But observe that the converse is not true, *i.e.*, it is not required that if the system is following a path of steady growth, it must be in equilibrium. If we solve the system (5) for the Ys, we find:

$$Y_t = \left[\frac{(1 + A) + \alpha(c + v)}{(1 + \alpha)}\right] Y_{t-1} - \left[\frac{\alpha v}{(1 + \alpha)}\right] Y_{t-2} + \frac{\alpha}{(1 + \alpha)} A_t$$

If $\alpha = 0$ (as perhaps in a fully planned economy) the system would move along the path

$$Y_t = (1 + A)Y_{t-1},$$

but it would not necessarily be in equilibrium.

By substitution from the second condition it can be reduced to:

$$A_t = \Upsilon_t\left(1 - \frac{c+v}{1+A} + \frac{v}{(1+A)^2}\right)$$

This tells us that equilibrium requires that autonomous investment of each period should be a constant fraction of the output of that period; or, since equilibrium requires that output should be expanding at a steady rate, it also requires that autonomous investment should be expanding at the same rate. But this is not a sufficient condition of equilibrium. For let us make the assumption that what is required of autonomous investment is actually so; an assumption that we shall cling to from now on. Supposing, then that it is a fact that:

$$A_t = (1+A)A_{t-1}$$

We can now reduce the first condition of equilibrium still further to

$$\frac{A_0}{\Upsilon_0} = \left(1 - \frac{c+v}{1+A} + \frac{v}{(1+A)^2}\right) \quad . \quad . \quad . \quad . \quad (6)$$

We might now be content to say that this tells us that if there is to be equilibrium there must be a certain relationship between the component parts of the system. But we must probe this relationship further; for there are two ways in which we can interpret it. On the one hand we can suppose that there is a particular desired rate of growth prevalent within the system, a certain value of A being adopted. In this case the condition (6) tells us what the structure of the system must be like if this rate of growth which it is attempting to put into effect is to lead it along a path of continuous equilibrium and, therefore, of steady progress. For example, if $(1+A)$ is 1·05, then the system will progress in equilibrium at a 5% rate of growth if (among other possibilities) $A_0 = 0{\cdot}1\Upsilon_0$, $c = 0{\cdot}8$ and $v = 3{\cdot}045$. On the other hand, we can observe the actual structure of the system, making measurements of A_0/Υ_0, c and v, and then use (6) to determine what rate of growth, A, the system would have to be attempting if it were to make steady progress in continuous equilibrium. For example, if we observed values of 0·1 for A_0/Υ_0, 0·8 for c and 2 for v, the system would have either to try to double itself each period or to grow by slightly over 11% in order to preserve equilibrium. Now the most satisfactory procedure, and the one which is preferred by Hicks, is the first.[1] What we are seeking is some datum line against which we can compare the actual movement of the system. On the second procedure, we search for a rate of growth which would preserve equilibrium within the actual structure of the system, an equilibrium rate of growth. The difficulty about this procedure is that the structure of the system as it is may make the equilibrium rate of growth fantastically unrealistic, or may even refuse to allow one to exist at all.[2] There is little point in attempting to compare the actual movement of the system with a path which may not be open to it at all

[1] Contribution to the *Theory of the Trade Cycle*, appendix to Chap. V, p. 184.

[2] In other words the equation (6) may have no real roots. See Alexander, "The Accelerator as a Generator of Steady Growth," *Q.J.E.*, May 1949.

or which in the real world it could never hope to attain. Following the first procedure, we can begin from a path which the system is actually attempting to follow, and study its aberrations from there, confident that these will occur unless the system is of a very special type. But we cannot really describe the desired path which the system attempts to follow as an equilibrium path. It is true that it could be a path along which equilibrium was continually realised, if the structure of the system were of a certain kind (if there were a certain relationship between c, v and A_0/Y_0), which if our theory is to be interesting we must assume it is not. We can, in fact, distinguish three paths. First, there is the path which the system actually follows, meeting and reacting to disequilibria, a path which can be traced by reducing the system of equations set out in (5) to the single difference equation:

$$Y_t = \left[\frac{(1+A)+\alpha(c+v)}{(1+\alpha)}\right] Y_{t-1} - \frac{\alpha v}{(1+\alpha)}\, Y_{t-2} + \frac{\alpha}{(1+\alpha)}\, A_t \quad . \quad (7)$$

Secondly, there is the path which the system is attempting to follow, or what may conveniently be called the desired rate of growth, described by:

$$Y_t = (1+A)Y_{t-1}$$

Thirdly, there is the path which the system would have to follow if it were to maintain itself continuously in equilibrium. It is the last of these possible paths which most obviously deserves the title of the equilibrium rate of growth. But for our purposes it is a mere *curiosum*. What should interest us is the comparison between the first and the second, between the path the system actually follows and that which it attempts to follow. Evidently this is also what interests Hicks[1]; but he confuses the proceedings by attaching to the latter path the label of equilibrium and thus misrepresenting its status.

This threefold distinction between the actual path, the desired path and the equilibrium path is of particular importance in the understanding of the mechanism by which the system turns down from full employment and recovers from a slump. A very important feature of Hicks' system are the restraints imposed upon its free movement, on the one hand, by the full employment ceiling and, on the other, by the limited rate at which surplus capital equipment is retired. He argues that when in the course of the boom the system hits the full-employment ceiling, it can no longer grow at a rate which will generate new capital requirements large enough to absorb the savings forthcoming at the boom level of income; and this produces the down-swing. Let us examine this mechanism in the light of our expanded model (5). Making the assumption that β is infinite, we find the actual, unrestrained path of the system as in (7). This we must compare with the desired path. Let us denote points along the desired path by $\overline{Y}$, so that we have:

$$\overline{Y}_t = (1+A)\overline{Y}_{t-1} = (1+A)^2\overline{Y}_{t-2} = \ldots = (1+A)^n\overline{Y}_{t-n} \quad . \quad (8)$$

[1] Hicks, *op. cit.*, p. 184: ". . . it is much more intelligible to suppose that g is already determined from the autonomous rate of growth of A_n."

For the ratio of actual output at time t to desired output at time t, write y_t. Thus dividing both sides of (7) by $\overline{Y}_t$, we find:

$$y_t - \left[\frac{(1+A)+\alpha(c+v)}{(1+\alpha)(1+A)}\right]y_{t-1} + \left[\frac{\alpha v}{(1+A)^2(1+\alpha)}\right]y_{t-2} = \frac{\alpha}{1+\alpha}\frac{A_t}{\overline{Y}_t} \quad . \quad . \quad . \quad (9)$$

This equation shows the proportionate deviation at any time of the actual from the desired path of the system; if $y_t = 1$, the system is at time t on the desired path. Now the situation which at the moment interests us is that which ensues upon the system's having struck the full-employment ceiling. At this point actual output is considerably in excess of what it would have been had the system held to its desired path. Let the ratio of actual to desired output at the moment when the ceiling was struck be k, k being in this case greater than one. If we assume that the maximum rate at which output can increase along the ceiling is the desired rate A, then as long as the system is moving along the ceiling, it exhibits the same ratio k to its desired path. Equation (9) enables us to determine whether, when the system has been moving along the ceiling with output k times the desired level, it will of its own volition turn down. If $y_{t-1} = y_{t-2} = k$, what will y_t be? From (9):

$$y_t = k\left(\frac{(1+A)+\alpha(c+v)}{(1+\alpha)(1+A)} - \frac{\alpha v}{(1+\alpha)(1+A)^2}\right) + \frac{\alpha}{(1+\alpha)}\frac{A_t}{\overline{Y}_t}$$

$$= k + \frac{\alpha}{(1+\alpha)}\left[\frac{A_t}{\overline{Y}_t} - k\left(1 - \frac{c+v}{(1+A)} + \frac{v}{(1+A)^2}\right)\right] \quad . \quad . \quad (10)$$

If the square bracket is positive, the impulse of the system at time t, were it unrestrained, would be to burst through the full-employment ceiling; but it will be prevented from doing this and will continue, not along the path indicated by (10), but along the ceiling.[1] But if k is large, the square bracket will be negative, and at time t the ratio of actual output to its desired path will be somewhat less than k. The downturn will have arrived. But it is possible that it may never arrive. Suppose that $A_t/\overline{Y}_t$, the proportion of desired output absorbed by autonomous investment, greatly exceeds [2]

$$\left(1 - \frac{c+v}{(1+A)} + \frac{v}{(1+A)^2}\right)$$

Then it may be that the full-employment value of k is still not large enough to make the square bracket in (10) anything other than positive; and if it remains positive, actual output must continue along the full-employment ceiling. Our general expectation that a downturn will occur, based on the fact that at full employment k is at its highest value, is subject to the qualifica-

[1] Or formally speaking, along the path indicated by (10) with α reduced to zero.

[2] Equality between $A_t/\overline{Y}_t$ and $\left(1 - \frac{c+v}{(1+A)} + \frac{v}{(1+A)^2}\right)$ constitutes the special case in which the desired path is also an equilibrium path.

tion that the system might possess so much upward bias, in the sense that $A_t/\overline{Y}_t$ greatly exceeded

$$\left(1 - \frac{c+v}{(1+A)} + \frac{v}{(1+A)^2}\right)$$

that it bumped indefinitely along the full-employment ceiling and never bounced off it towards the floor. The mechanism of the upswing can also be studied in (10). When the system is moving along the floor, k is less than one; and this makes it likely that the square bracket in (10) will be positive and that output will rise above the floor to begin the recovery. *A fortiori*, this must happen if the system possesses an upward bias in the sense defined above. But if it has a downward bias, our expectation of recovery will not necessarily be fulfilled. For even a small value of k may leave the square bracket of (10) negative and the system irretrievably depressed. In the general case, where the values of $A_t/\overline{Y}_t$ and of

$$\left(1 - \frac{c+v}{(1+A)} + \frac{v}{(1+A)^2}\right)$$

are not very greatly different, we can be confident that the Hicksian restraints on the free movement of the system will successfully perform their intended function of providing it with its turning points. In other words, the movement of k from its low slump value to its high value at full employment (and vice versa) will be enough to change the square bracket of (10) from positive to negative (and back again). But the distinction we have made between the desired path of the system and its equilibrium path has brought to light the possibility of booms and slumps which have no inclination to reverse themselves but are happy to bump chronically along the ceiling or the floor.

We began our examination of Hicks' theory by bringing out his special supply assumption and questioning its consistency with other parts of his model. We then found that the adoption of this special supply assumption raised terminological difficulties in later stages of his analysis. It led him to ask a meaningless question about the possibility of equilibrium and then to apply the term " equilibrium rate of growth " to a path which could have the property of equilibrium only under very special circumstances. This confused use of terms arose from his failure to make an explicit statement of the supply side of his model. This we have done in (5); and it remains to test the properties of the expanded model in its reduced form (9). Let us remind ourselves that the mainspring of Hicks' theory is the tendency of his system to exhibit explosive fluctuations. Will these occur, and under what conditions, in the expanded version of it?

Consider first the homogeneous difference equation obtained by setting the left-hand side of (9) equal to zero. It is exactly similar in form to Hicks' own " basic equation ":

$$y_t - (c+v)y_{t-1} + vy_{t-2} = 0$$

and the key element of this expression is the coefficient of y_{t-2}. If the coefficient of y_{t-2} exceeds unity in a difference equation of this form, the ys

will exhibit explosive fluctuations, or in the extreme case unfluctuating explosion. It is evident that the constant term on the right-hand side of (9) cannot qualify this condition for explosive behaviour.[1] Thus the expanded version of Hicks' system, with supply assumptions made explicit, will behave according to plan as long as:

$$\frac{\alpha v}{(1+\alpha)(1+A)^2} > 1$$

Now in the original version of Hicks' model explosive fluctuations merely required that v should exceed unity; and it seemed almost certain that this would be the case. But in our expanded version, to the extent that the acceleration principle suggests that output in the short period is comparatively unresponsive to the existence of disequilibrium between supply and demand, we cannot be so certain that the condition for explosive fluctuations will be present. If a large v implies a small α, we cannot be at all confident that the coefficient of y_{t-2} in our equation (9) will exceed unity. It is not, of course, impossible that it should; but the mainspring of the system may be a good deal less resilient than was thought. The chances are as great that it will run down altogether as that its natural violence will hurl it against the ceiling and bounce it down to the floor.

It seems, then, that in denying Hicks' system his special supply assumption, we may also deprive it of its essential kick. But we cannot leave matters there. For we have been guilty of an illogicality. Whether or not we are right in suggesting that the acceleration principle implies that output is unresponsive in the short run, there will sometimes be circumstances in which this is the case, in which it is difficult to adjust output without adjusting capital. To cover these circumstances we ought to frame the accelerator in such a way as to make the investment component of aggregate demand depend, not upon the way in which output actually changes, but upon the way in which entrepreneurs would like it to change if it were possible. Writing I_t for the demand for net investment at time t, what we have done hitherto is to suppose:

$$I_t = v(Y_{t-1} - Y_{t-2}) \quad . \quad . \quad . \quad . \quad . \quad . \quad (11)$$

in other words, to suppose that it depends upon an actual change in output. But if the actual change in output has been held down to a low figure because

[1] The solution of the non-homogeneous difference equation (9) will have the form

$$y_t = y_0\left(\sqrt{\frac{\alpha v}{(1+\alpha)(1+A)}}\right)^t \frac{\cos(t\theta+\epsilon)}{\cos\epsilon} + K$$

where K is a particular solution. In this case

$$K = y_0 \frac{A_0}{Y_0} \frac{(1+A)^2}{(1+A)^2 - (c+v)(1+A) + v}$$

The maximum value that y can reach in the course of each cycle is:

$$y_t(\text{max.}) = \frac{y_0}{\cos\epsilon}\left(\sqrt{\frac{\alpha v}{(1+\alpha)(1+A)}}\right)^t + K$$

As long as the expression in the square root (the coefficient of y_{t-2}) exceeds unity, this maximum will increase with time, *i.e.*, at the top of each successive boom output will be proportionately farther from the desired path.

it is difficult to achieve much without adding to capital, it is absurd to suppose that the demand for capital is also kept low by the same influence. Because output has *not* been able to respond, the demand for capital will be intense. It will be more logical if we make the latter depend instead upon how output could have responded if the necessary capital had been there; in other words, upon the change in aggregate demand. In place of (11) we had better write[1]:

$$I_t = v(D_{t-1} - D_{t-2}) \quad . \quad . \quad . \quad . \quad . \quad . \quad (12)$$

At the same time it will be convenient to make a second amendment to our expanded system as stated in (5). There lurks within the supply equation:

$$Y_t = (1 + A)Y_{t-1} + \alpha(D_t - Y_t)$$

an instantaneous component which seems out of place among the lags which hold sway everywhere else. Output in a certain period is determined partly by what happens within that period. Let us make the system lagged throughout and suppose that output in a certain period is determined only by what has already happened in a previous period. Thus the supply equation becomes:

$$Y_t = (1 + A)Y_{t-1} + \alpha(D_{t-1} - Y_{t-1}) \quad . \quad . \quad . \quad (13)$$

But now that we have introduced a lag into the adjustment of output to demand, a perfect adjustment, such as we have accused Hicks of assuming to take place, no longer requires an infinite α. In period t, with our new supply equation (13), the size of the disequilibrium resulting from time $t-1$, which must now be met, is known before period ts output is determined. All that is required for perfect adjustment of output to demand is that output should be adjusted by the known finite amount that is needed. Perfect adjustment will be represented by $\alpha = (1 + A)$, in which case we have from (13):

$$\frac{Y_t}{(1 + A)} = D_{t-1}$$

that is, output in the current period, discounted for the trend factor which also influences it, accommodates itself exactly to the demand of the previous period. If we interpret perfect adjustment in this way, we can no longer pretend that (13) is a general form of Hicks' special supply assumption; for no finite value of α can reduce (13) to the Hicksian proposition that $Y_t = D_t$. But (13) is a formulation which should not be repugnant to Hicks. Moreover, it has the advantage that it enables us to take account of conditions under which the supply adjustment is more than perfect as well as less, *i.e.*, when

$$\frac{Y_t}{(1 + A)} > D_{t-1}$$

[1] This formulation meets also the circumstances in which (despite the acceleration principle) output can respond in the short period; for then the Ys and the Ds do not greatly differ.

Setting out our expanded system complete with the two amendments suggested:

$$\left.\begin{aligned} D_t &= A_t + cY_{t-1} + v(D_{t-1} - D_{t-2}) \\ Y_t &= (1 + A)Y_{t-1} + \alpha(D_{t-1} - Y_{t-1}) \end{aligned}\right\} \quad . \quad . \quad . \quad (14)$$

we can, I think, still confidently describe it as Hicksian. Our purpose now is to study the properties of this expanded and amended Hicksian model, and in particular its propensity for explosive oscillation; and to see how it is influenced by different conditions of short-period supply as described by α.

The system in (14) is easily manipulated into a difference equation:

$$Y_t - [(1 + A) - \alpha + v]Y_{t-1} + [v(1 + A) - \alpha(c + v) + v]Y_{t-2} - [v(1 + A) - \alpha v]Y_{t-3} = \alpha A_{t-1}$$

and dividing both sides by $\overline{Y}_t$, desired output, into a difference equation in the ys:

$$y_t - \left[\frac{(1 + A) - \alpha + v}{(1 + A)}\right]y_{t-1} + \left[\frac{v(1 + A) - \alpha(c + v) + v}{(1 + A)^2}\right]y_{t-2} - \left[\frac{v(1 + A) - \alpha v}{(1 + A)^3}\right]y_{t-3} = \frac{\alpha}{(1 + A)}\frac{A_0}{\overline{Y}_0} \quad . \quad . \quad . \quad (15)$$

The solution of this equation is presented and discussed in the Appendices; but the influence of the short-period supply factor on the behaviour of the system is best studied in the following table. Here there are computed for various values of v and α, and assuming throughout that $c = 0{\cdot}8$ and $A = 0{\cdot}03$, the moduli of the complex roots of equation (15). For our purpose the significance of the modulus is that when it exceeds unity the equation will exhibit explosive oscillations as required in a Hicksian system; and when it is less than unity, the oscillations will progressively damp themselves out and the system will cease to be Hicksian. The results in the table are expressed graphically in the diagram. No entry is made in the column of the table, where $v = 3$ for values of α of 0·8 and above, because in these circumstances the system explodes without oscillation; and none is made in the diagram where $v = 1{\cdot}2$ for values of α in the neighbourhood of 1, because here the system converges without oscillation on a particular value of y. Values of α greater than 1·5 have not been shown because soon after α has advanced beyond this level (and in all cases when it has advanced to 2) it subjects the system to period-to-period oscillations of increasing violence, and it ceases to be of interest as a model of the trade cycle as we know it.

Reasons are advanced in Appendix I for believing (although I have not been able to show this conclusively) that the results of the table are general. What are these results? Most important is the fact that if the system is to be explosive whatever the conditions of short-period supply (whatever α), then v must certainly be greater than two. Values of v between one and two which were sufficient to explode Hicks' original model will in our model damp it out, except for extreme values of α. It will clear the ground if at this point

we say something about these extreme values. First of all, consider the explosiveness which seems to be inherent in very low values of α. The

TABLE

The Influence of α on the Modulus of (15)

	α	$v = 1{\cdot}2$	$v = 1{\cdot}5$	$v = 2{\cdot}0$	$v = 2{\cdot}5$	$v = 3{\cdot}0$
More than perfect adjustment	1·5	0·81	0·94	1·14	1·31	—
	1·2	0·72	0·87	1·09	1·28	—
Perfect adjustment	1·03	0·59	0·80	1·05	1·26	—
Less than perfect adjustment	0·8	0·56	0·67	0·98	1·22	—
	0·6	0·74	0·83	1·01	1·20	1·39
	0·4	0·86	0·97	1·13	1·26	1·44
	0·2	0·97	1·09	1·26	1·41	1·54
	0·0	1·06	1·19	1·37	1·53	1·68

($A = 0{\cdot}03$; $c = 0{\cdot}8$).

movement of our model is determined by a weighted average of the real root, which is less than unity, and the complex roots;[1] and when α is low the weight attached to the real root is large and the weight attached to the complex roots is small.[2] Consequently the system is dominated in the early stages of its movement by the real root of less than unity, and will begin to exhibit the explosiveness inherent in its complex roots (whose modulus is made greater than unity by a low α) only after enough time has elapsed for the real root to damp itself into insignificance. The explosion, although it will occur eventually, will be long delayed; and for this reason the instability which our system is capable of exhibiting in the special case of a low α is not very interesting. For the long delay before the instability becomes significant must call in question the constant coefficients which we have used throughout and which are tolerable only if they can be shown to produce a rapid explosion. If we are trying to show, then, that the cycle is a product of the inherent explosiveness of the economic system, penned in by external restraints, we shall not be much excited by an explosion which requires such a long fuse to set it off as is necessary when α is low. We should regard such an explosion as an isolated phenomenon produced by special circumstances rather than as one which is generally interesting.

We may now turn in the opposite direction to the high values of α which also appear to increase the willingness of the system to explode. But again we must look carefully at the nature of the explosion. When α has reached a value of 2 the system will be subject to fluctuations of increasing amplitude,

[1] The general solution (see Appendices) has the form:

$$y_t = B + \left(\frac{z \cdot \cos(\theta + \epsilon) - \cos\epsilon}{z \cdot \cos(\theta + \epsilon) - x_1 \cos}\right) x_1^t + \left(\frac{(1 - x_1)}{z \cdot \cos(\theta + \epsilon) - x_1 \cos\epsilon}\right) z^t \cos(t\theta + \epsilon)$$

where B is a particular solution, x_1 is the real root of less than unity and z is the modulus, which is a function of x_1.

[2] When α is zero the latter weight reduces to zero, so that (as we should expect when output cannot respond at all to a disequilibrium between supply and demand) no fluctuations occur.

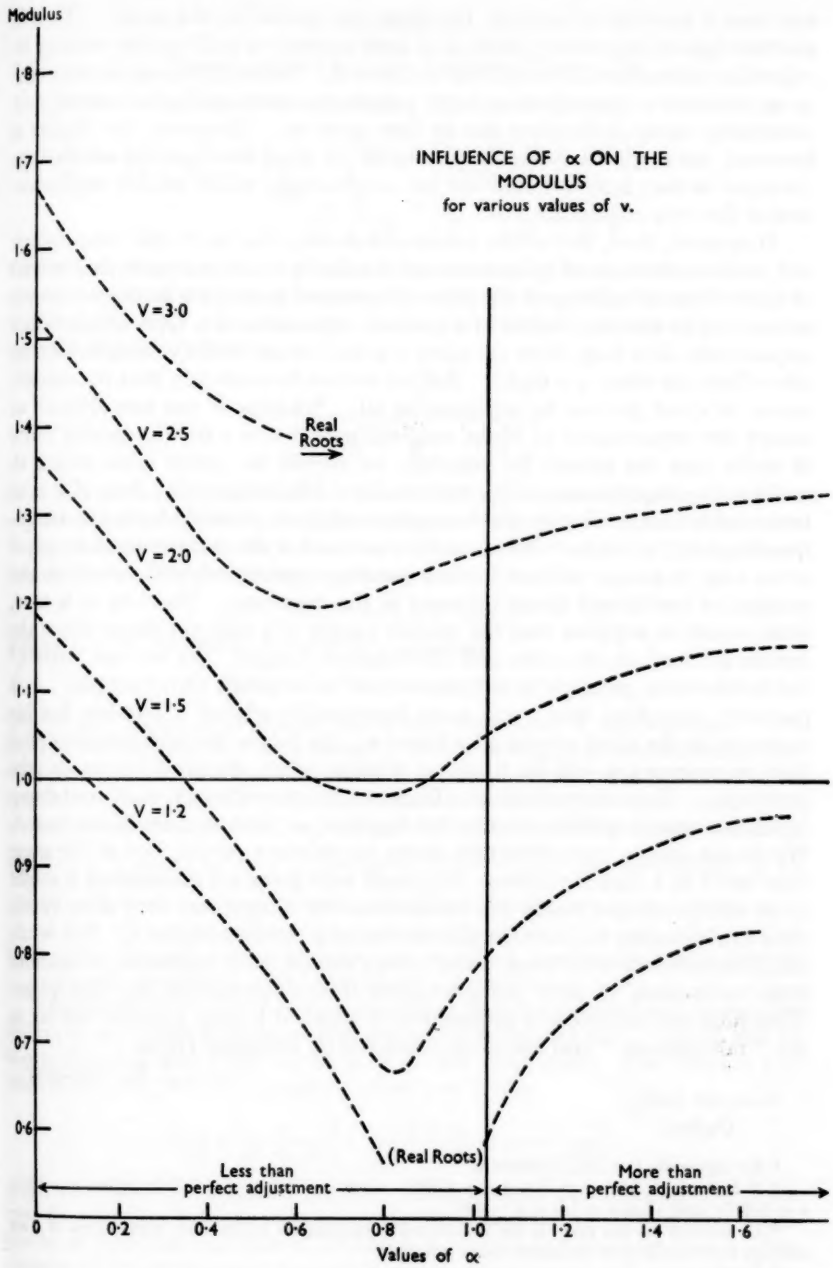
Modulus
INFLUENCE OF α ON THE MODULUS
for various values of v.
V = 3·0
V = 2·5
V = 2·0
V = 1·5
V = 1·2
Real Roots
(Real Roots)
Less than perfect adjustment
More than perfect adjustment
1·8
1·7
1·6
1·5
1·4
1·3
1·2
1·1
1·0
0·9
0·8
0·7
0·6
0
0·2
0·4
0·6
0·8
1·0
1·2
1·4
1·6
Values of α

DIAGRAM A

not over a number of periods, but from one period to the next.[1] This is another type of behaviour which is of little interest to us if we are seeking to reproduce in our model the cycle as we know it. Before this stage is reached,[2] as we advance α upwards from 1·03, period-to-period oscillations occur, but eventually damp themselves out as time goes on. However, the higher α becomes, the more the system is dominated by these short-period oscillations (damped as they may be), and the less convincingly will it exhibit explosiveness of the type required.[3]

It appears, then, that of the values of α shown, it is the middle ones which will produce the type of behaviour which is likely to interest most that school of cycle theories built upon the idea of a natural instability in the economic system. The extreme values of α produce explosions of a type which either appear only after long delay (as when α is low) or are unduly complicated by side-effects (as when α is high). But we cannot be confident that the middle values of α will give us an explosion at all. Whereas it was not difficult to accept the requirement of Hicks' original model that v should exceed unity in order that the system be unstable, we should be under some strain to swallow the requirement of our reformulated Hicksian model that, if it is to be unstable independently of the supply conditions, v should be in the neighbourhood of 2 or more. When we take account of the conditions of supply it is less easy to accept without further question a portrayal of the cycle as the product of centrifugal forces inherent in the economy. There is, it is true, some reason to suppose that the middle ranges of α may not damp down the system as much as the table and the diagram suggest. As we saw earlier,[4] the acceleration principle is not innocent of assumptions about supply. It is probable, therefore, that v and α are functionally related. The less flexible is supply in the short period (the lower α), the larger the additional capital that entrepreneurs will be likely to require when demand increases (the greater v). Thus as we diminish α from a value exceeding $(1 + A)$ and damp down the system as illustrated in the diagram, we simultaneously increase v. We do not simply move leftwards down one of the v curves, but at the same time move to a higher v curve. Although with given v a diminished α might in its middle ranges damp the oscillations out altogether, they may retain their explosiveness because the diminution of α causes a higher v. But while this inverse relation between v and α may defend some explosive oscillations from extinction, it does not guarantee their existence in the first place. That such are possible is a proposition of which it is only possible for us to say " non-proven " and ask to be reassured by Professor Hicks.

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[1] See Appendix I, p. 657, footnote 1.

[2] It is reached, when $v = 2{\cdot}5$ at $\alpha = 1{\cdot}795$; when $v = 2{\cdot}0$ at $\alpha = 1{\cdot}754$; when $v = 1{\cdot}5$ at $\alpha = 1{\cdot}697$; and when $v = 1{\cdot}2$ at $\alpha = 1{\cdot}65$.

[3] In addition to this there is the consideration emphasised earlier that high values of α are difficult to reconcile with the acceleration principle.

[4] P. 638.

Appendix I

Properties of the Third-order Difference Equation (15)

The general solution of the third-order difference equation:

$$y_t - \left[\frac{(1+A)-\alpha+v}{(1+A)}\right]y_{t-1} + \left[\frac{v(1+A)-\alpha(c+v)+v}{(1+A)^2}\right]y_{t-2} - \left[\frac{v(1+A)-\alpha v}{(1+A)^3}\right]y_{t-3} = \frac{\alpha}{(1+A)}\frac{A_0}{Y_0} \quad . \quad . \quad . \quad (a)$$

will consist of a particular solution of the non-homogeneous equation plus the general solution of the homogeneous equation obtained by setting the left-hand side of (*a*) equal to zero. The particular solution is easy to find; the non-homogeneous equation will be satisfied by:

$$y_t = \frac{\frac{A_0}{Y_0}}{1 - \frac{c+v}{(1+A)} + \frac{v}{(1+A)^2}}$$

Since this particular solution is independent of α, we need not concern ourselves with it when we are investigating the influence of α on the behaviour of the system. We need only look at the influence of α on the solution of the homogeneous equation. Let us write the homogeneous equation as:

$$y_t + a_1 y_{t-1} + a_2 y_{t-2} + a_3 y_{t-3} = 0 \quad . \quad . \quad . \quad . \quad . \quad (b)$$

Putting $y_t = x^t$, we find its characteristic equation:

$$f(x) = x^3 + a_1 x^2 + a_2 x + a_3 = 0 \quad . \quad . \quad . \quad . \quad . \quad (c)$$

Can we say anything in general about the three roots of this equation? We know, of course, that they must either be all real or consist of one real and a pair of complex roots. We can go further than this, however, and observe that as long as α is less than $(1 + A)$, there cannot be any negative real roots. For when α is less than $(1 + A)$, a_1 and a_2 of (*c*) are necessarily negative, and a_3, which if α is equal to $(1 + A)$ becomes $\frac{v - (1+A)c}{(1+A)^2}$, can be assumed to be positive. If, then, we try any negative real value of x in the characteristic equation (*c*), all four of its terms will be negative and cannot add up to zero. Let us then leave aside the case where negative real roots are possible because α exceeds $(1 + A)$ and concentrate on the case where α is less than $(1 + A)$.

It follows from the fact that there must be at least one real root and no negative real roots, that there must be at least one real positive root of (*c*). It can also be shown that this real positive root must be less than unity. The value of $f(x)$ when $x = 0$ is a_3, which is negative; when $x = 1$, it is:

$$f(x)_{-1} = \frac{\alpha}{(1+A)}\left(1 - \frac{c+v}{(1+A)} + \frac{v}{(1+A)^2}\right)$$

which can safely be assumed positive. Consequently the function $f(x)$ must cross the zero line between zero and one. (See diagram B.) There must therefore be at least one real root of (*c*) which is positive and less than unity. This property of (*c*) is important because it means that one root will damp itself out

after a while and any explosive potential which the system possesses when α is less than $(1 + A)$ must reside within the other two. It is also evident that this real root increases steadily from zero to unity as α falls from $(1 + A)$ to zero.

Let us now look at the two special cases in which $\alpha = (1 + A)$ and $\alpha = 0$. When $\alpha = (1 + A)$, $a_3 = 0$; and since a_3 is the value of $f(x)$ when $x = 0$, there is

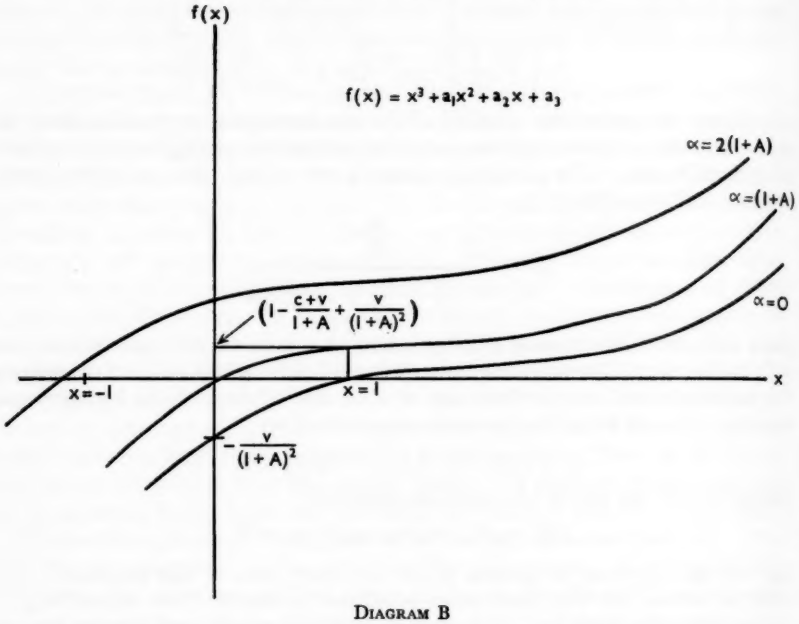

DIAGRAM B

obviously a solution at $x = 0$. Let us call this root x_1. The other two roots, x_2 and x_3, can be deduced from the known relations between roots and coefficients:

$$\left.\begin{aligned} x_1 + x_2 + x_3 &= -a_1 \\ x_1x_2 + x_2x_3 + x_1x_3 &= a_2 \end{aligned}\right\} \quad . \quad . \quad . \quad . \quad . \quad (d)$$

When $\alpha = (1 + A)$, $a_1 = -\dfrac{v}{(1 + A)}$, and $a_2 = \dfrac{v - (1 + A)c}{(1 + A)^2}$. Solving (*d*), we find that x_2 and x_3 come to:

$$\frac{1}{2(1 + A)}\left(v \pm \sqrt{v^2 - 4v + 4(1 + A)c}\right)$$

They will be real if:

$$v^2 - 4v + 4(1 + A)c > 0$$

and if this expression is negative, they will be a pair of conjugate complex roots. Now our main interest in the roots of the characteristic equation (*c*) is to investigate its explosive potential; and for this we shall have to concentrate our search on the area of complex roots. For somewhere within this area the system will undergo a change from exhibiting damped to exhibiting explosive oscillations. Once it has emerged into the clear air of real roots, we know that it will either die or explode

without a flicker of fluctuation; but somewhere within the area of complex roots there lies the crucial frontier, which we must determine, between explosive and damped oscillation. Let us assume, then, that

$$v^2 - 4v + 4(1 + A)c < 0$$

so that for $\alpha = (1 + A)$ the two roots x_2 and x_3 are complex conjugates. They can therefore be written:

$$\frac{v}{2(1 + A)} \pm i\sqrt{-v^2 + 4v - 4(1 + A)c}$$

and their modulus will be:

$$\sqrt{\frac{v - (1 + A)c}{(1 + A)^2}}$$

Now consider the other special case where $\alpha = 0$. When $\alpha = 0$ we have:

$$\underset{x=1}{f(x)} = \frac{\alpha}{(1 + A)}\left(1 - \frac{c + v}{(1 + A)} + \frac{v}{(1 + A)^2}\right) = 0$$

There is therefore a solution at $x_1 = 1$. From known relations of coefficients and roots as before, we can work out the other two roots, x_2 and x_3:

$$\frac{1}{2(1 + A)}(v \pm \sqrt{v^2 - 4v})$$

Since we have already assumed that $v^2 - 4v + 4(1 + A)c < 0$, it follows *a fortiori* that $v^2 - 4v < 0$. When $\alpha = 0$ therefore x_2 and x_3 are a pair of conjugate complex roots, whose modulus will be:

$$\sqrt{\frac{v}{(1 + A)^2}}$$

What have we found out so far about the properties of (c)? We have found out that for values of α below $(1 + A)$:

(1) it must have one real root which is positive and less than unity; and

(2) for values of v in the middle ranges of the possible, *i.e.*, when $v^2 - 4v + 4(1 + A)c < 0$,[1] the other two roots will be complex conjugates whose moduli are $\sqrt{\frac{v - (1 + A)c}{(1 + A)^2}}$ when $\alpha = (1 + A)$ and $\sqrt{\frac{v}{(1 + A)^2}}$ when $\alpha = 0$.

Now it is these moduli which particularly concern us. For whether the oscillations of our revised Hicksian system expressed in (a) are explosive depends upon the modulus of its complex roots exceeding unity.[2] It will be obvious that in the case where $\alpha = (1 + A)$, which most nearly approximates the supply assumption of Hicks' original model, v must *considerably* exceed $(1 + A)$ in order to provide explosive fluctuations; it will not suffice, as in the original, for it *just* to exceed $(1 + A)$. On the other hand, when $\alpha = 0$, a value of v which just exceeds $(1 + A)$ does provide a sufficient condition for explosive fluctuation.[3] Our problem is to determine what happens to the modulus of the complex roots as we

[1] If $(1 + A) = 1{\cdot}03$ and $c = 0{\cdot}8$, x_2 and x_3 will be real if v exceeds $2{\cdot}839$ or is below $1{\cdot}161$.

[2] The real root, as we have seen, is less than unity, and cannot contribute to any explosion.

[3] But in this case, as we shall see, no oscillations actually occur, as indeed is obvious from the fact that $\alpha = 0$ means that the system cannot move from its desired path whatever disequilibria there may be to tempt it to do so.

diminish α from $(1 + A)$ towards zero. As the adjustment of supply to excess demand becomes progressively less perfect, will it damp down the explosive potential of the system, or increase it, or have some more complicated effect?

The answer which is suggested to this question by the numerical computations on p. 650 I have not been able to confirm with a general proof; but some light may be thrown on it by what follows. It is shown in Appendix II that the general solution of (*b*), in the case where complex roots exist, is of the form:

$$y_t = A_1 x_1^t + A_2(\sqrt{x_1^2 + a_1 x_1 + a_2})^t \cos(t\theta + \epsilon) \quad . \quad . \quad . \quad (e)$$

where A_1 and A_2 are constants to be determined from the initial conditions and x_1 is the real positive root of less than unity which we have seen must exist when α is less than $(1 + A)$. This formulation is useful because it exhibits the modulus of the complex roots as a function of the real root. Consider the function:

$$\phi(x) = x_1^2 + a_1 x_1 + a_2 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (f)$$

We want to know how this function is influenced by α. There is a double influence. Not only does a change in α change the coefficients a_1 and a_2; it also changes x_1. For as we have seen, when $\alpha = (1 + A)$, $x_1 = 0$, and when $\alpha = 0$, $x_1 = 1$; and the value of x_1 rises steadily from zero to unity as α declines from $(1 + A)$ to zero. In diagram C the ϕ function is plotted with respect to x_1 for given values of α. But the dependence of x_1 on α means that only one point on each α-curve is possible. Suppose we start from $\alpha = (1 + A)$. Then $x_1 = 0$ and we are at point A on the middle α-curve. As we diminish α, two conflicting effects occur. Because we have diminished α we have raised x_1 and therefore move to the right down the curve from A; but because we have diminished α we must move to a higher α curve. So the square of the modulus, or ϕ function, is lowered by the first effect and raised by the second. It seems reasonable to infer, although I have not been able to prove,[1] the conclusion that the numerical examples on p. 649 suggest; namely that as we first begin to diminish α from $(1 + A)$, the first effect prevails because the α curves are relatively steep at their left-hand ends and the slide down the curve overcomes the jump to a higher curve. As we go on, however, this downward pressure on the modulus is relaxed, since the α curves become flatter and the second effect prevails, thus raising the square of the modulus until it reaches $\frac{v}{(1 + A)^2}$ when $\alpha = 0$ (point C in diagram C).

Hitherto we have considered only the case in which α is less than $(1 + A)$—the case of less than perfect supply adjustment—when only positive real roots are possible. But if α is raised above $(1 + A)$ we come into the range of negative real roots. For $f(x)$ when $x_1 = 0$ has the value a_3, which is positive when α exceeds $(1 + A)$; and as x_1 tends towards minus infinity $f(x)$ must become negative as the x_1^3 term predominates. It must therefore cross the zero line somewhere between zero and minus infinity, yielding a negative real root. This will superimpose upon whatever fluctuations are generated by the other roots a period-to-period oscillation. So long as the negative real root is less than unity,

[1] The difficulty lies in the fact that in order to show the conditions under which the conclusion would be true, a necessary step is the explicit evaluation of x_1 in terms of a_1, a_2 and a_3. There is no reason in principle why this should not be done, as the reader can see by referring to Appendix II; but the results show no sign of resolving themselves into any remotely illuminating form.

these period-to-period movements damp themselves out after a while and the system is dominated by its other roots. But if it is greater than unity it transforms the character of the system in a direction which makes it no longer interesting for trade-cycle analysis; for it is dominated by the period-to-period fluctuation.[1] Now as we cross into the territory of negative real roots, by raising α from $(1 + A)$, what will the effect be upon the modulus of the complex roots? It seems reasonable to suppose that it will increase. Referring again to diagram C, when $\alpha = (1 + A)$ we are at point A. As we raise α above $(1 + A)$ we drop to a lower α curve and this in itself has a dampening influence on the modulus. But at the same time, because x_1 changes, we move up the curve to the left; and this,

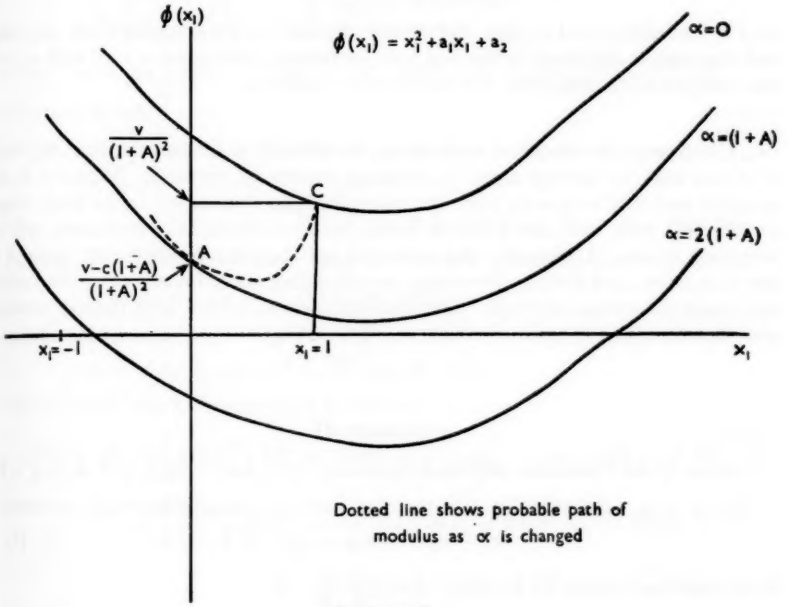

DIAGRAM C

taken by itself, will increase the modulus. Since the slope of the α-curve is relatively steep and getting steeper as we move to the left, the second influence will tend to overcome the first and the modulus will increase. Again it must be said that I have not been able to demonstrate this; but the argument above gives us confidence in the generality of the numerical example on p. 649, which shows this result.

Fully to understand the behaviour of (*b*), however, we must look not only at the modulus of the complex roots but at the system as a whole. It is shown in

[1] This will occur before α has reached the value of $2(1 + A)$; for with $\alpha = 2(1 + A)$ we have:

$$\underset{x=-1}{f(x)} = \frac{2c}{(1 + A)}$$

i.e., $f(x)$ is still positive and will only cross the zero line when x has become more negative. If it is to cross it while x still has a negative value of less than unity, α must be less than $2(1 + A)$.

Appendix II that with initial conditions $y_0 = y_1 = 1$, *i.e.*, assuming that initially the system is moving along the desired path, the general solution can be expressed:

$$y_t = \frac{(z \cdot \cos(\theta + \varepsilon) - \cos\varepsilon)x_1^t + (1 - x_1)(\sqrt{z})^t \cos(t\theta + \varepsilon)}{(z \cdot \cos(\theta + \varepsilon) - x_1 \cos\varepsilon)} \quad . \quad . \quad (g)$$

where x_1 is the real root and $z = x_1^2 + a_1x_1 + a_2$. The general solution is thus a weighted average of the real root and the complex roots. But the weights as well as the roots themselves are functions of α. As we have seen, when $\alpha = (1 + A)$, $x_1 = 0$; and in this case (g) reduces to the original Hicksian form:

$$y_t = \frac{1}{a_2 \cos(\theta + \varepsilon)} (\sqrt{a_2})^t \cos(t\theta + \varepsilon)$$

As α is diminished and x_1 rises, the weight attached to the complex roots decreases and the weight attached to the real root increases, until when $\alpha = 0$ and $x_1 = 1$ the complex roots disappear and the solution becomes:

$$y_t = 1$$

i.e., the system continues to move along its desired path because, α being zero, it is not able to diverge from it to adjust supply to demand. When α is not actually zero but is close to zero, the system will be dominated in its early stages by the real root, and the complex roots, however potentially explosive, will be weighted down. Ultimately the real root will become insignificant, since it is less than unity, and the complex roots, provided their modulus is greater than unity, will make the system explode. But the explosion may be a long time in coming, and therefore, as argued in the text, less interesting.

Appendix II

Solution of the Third-order Difference Equation $y_t + a_1y_{t-1} + a_2y_{t-2} + a_3y_{t-3} = 0$

Put $x^t = y_t$. Substituting into the above we get the characteristic equation:

$$x^3 + a_1x^2 + a_2x + a_3 = 0 \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

Eliminate the x^2 term by putting: $x = z - \frac{a_1}{3}$

We then get:

$$z^3 + \left(a_2 - \frac{a_1^2}{3}\right)z + \left(\frac{2a_1^3}{27} - \frac{a_1a_2}{3} + a_3\right) = 0 \quad . \quad . \quad . \quad (2)$$

If $z = n$ is a solution of (2), then $x = \left(n - \frac{a_1}{3}\right)$ is a solution of (1). Write (2) in the form:

$$z^3 + qz + r = 0$$

Its roots are:

$$z_1 = -\sqrt[3]{L} - \sqrt[3]{M}$$
$$z_2 = -\omega\sqrt[3]{L} - \omega^2\sqrt[3]{M} \qquad \text{where } \omega = \left(\cos\frac{2}{3}\pi + i\sin\frac{2}{3}\pi\right)$$
$$z_3 = -\omega^2\sqrt[3]{L} - \omega\sqrt[3]{M}$$

where $L = \frac{r}{2} + \sqrt{\frac{r^2}{4} + \frac{q^3}{27}}$ and $M = \frac{r}{2} - \sqrt{\frac{r^2}{4} + \frac{q^3}{27}}$.

The roots of (1) are therefore:

$$x_1 = -\sqrt[3]{L} - \sqrt[3]{M} - \frac{a_1}{3}$$

$$x_2 = -\omega\sqrt[3]{L} - \omega^2\sqrt[3]{M} - \frac{a_1}{3}$$

$$x_3 = -\omega^2\sqrt[3]{L} - \omega\sqrt[3]{M} - \frac{a_1}{3}$$

Suppose that L and M are real numbers $\left(i.e., \frac{r^2}{4} + \frac{q^3}{27} > 0\right)$. Then x_1 is a real root of (1) and x_2 and x_3 are conjugate complex roots which can be written:

$$x_2 = c + di$$
$$x_3 = c - di$$

where $c = \cos\frac{\pi}{3}(\sqrt[3]{L} + \sqrt[3]{M}) - \frac{a_1}{3}$, and $d = -\sin\frac{\pi}{3}(\sqrt[3]{L} - \sqrt[3]{M})$.
(See note at end.)

The general solution of the difference equation in the ys will then be:

$$y_t = Ax_1^t + B(c + di)^t + C(c - di)^t$$
$$= Ax_1^t + [\sqrt{(c^2 + d^2)}]^t(B(\cos t\theta + i\sin t\theta) + C(\cos t\theta - i\sin t\theta))$$

Putting $B = k(\cos\varepsilon + i\sin\varepsilon)$ and $C = k(\cos\varepsilon - i\sin\varepsilon)$, this reduces to:

$$y_t = Ax_1^t + (\sqrt{c^2 + d^2})^t 2k\cos(t\theta + \varepsilon)$$

which can be written:

$$y_t = A_1x_1^t + A_2(\sqrt{c^2 + d^2})^t\cos(t\theta + \varepsilon)$$

The modulus can be worked out as follows:

$$(\sqrt{c^2 + d^2}) = \left[\left(\cos\frac{\pi}{3}(\sqrt[3]{L} + \sqrt[3]{M}) - \frac{a_1}{3}\right)^2 + \left(-\sin\frac{\pi}{3}(\sqrt[3]{L} - \sqrt[3]{M})\right)^2\right]^{\frac{1}{2}}$$

$$= \left[\cos^2\frac{\pi}{3}(\sqrt[3]{L})^2 + \cos^2\frac{\pi}{3}(\sqrt[3]{M})^2 + 2\cos^2\frac{\pi}{3}(\sqrt[3]{L}\sqrt[3]{M}) + \frac{a_1^2}{9} - 2\frac{a_1}{3}\cos\frac{\pi}{3}(\sqrt[3]{L} + \sqrt[3]{M}) + \sin^2\frac{\pi}{3}(\sqrt[3]{L})^2 + \sin^2\frac{\pi}{3}(\sqrt[3]{M})^2 - 2\sin^2\frac{\pi}{3}(\sqrt[3]{L}\sqrt[3]{M})\right]^{\frac{1}{2}}$$

$$= \left[(\sqrt[3]{L})^2 + (\sqrt[3]{M})^2 + 2(\sqrt[3]{L}\sqrt[3]{M})\left(\cos^2\frac{\pi}{3} - \sin^2\frac{\pi}{3}\right) + \frac{a_1^2}{9} - \frac{2a_1}{3}\cos\frac{\pi}{3}(\sqrt[3]{L} + \sqrt[3]{M})\right]^{\frac{1}{2}}$$

$$= \left[(\sqrt[3]{L})^2 + (\sqrt[3]{M})^2 + 2(\sqrt[3]{L}\sqrt[3]{M})\cos\frac{2}{3}\pi + \frac{a_1^2}{3} - \frac{2a_1}{3}\cos\frac{\pi}{3}(\sqrt[3]{L} + \sqrt[3]{M})\right]^{\frac{1}{2}}$$

$$= \left[(\sqrt[3]{L})^2 + (\sqrt[3]{M})^2 - (\sqrt[3]{L}\sqrt[3]{M}) + \frac{a_1^2}{9} - \frac{a}{3}(\sqrt[3]{L} + \sqrt[3]{M})\right]^{\frac{1}{2}}$$

Now since the square of the real root x_1 is:

$$x_1^2 = (\sqrt[3]{L})^2 + (\sqrt[3]{M})^2 + 2(\sqrt[3]{L}\sqrt[3]{M}) + \frac{a_1^2}{9} + \frac{2a_1}{3}(\sqrt[3]{L} + \sqrt[3]{M})$$

we can write:

$$(\sqrt{c^2 + d^2}) = [x_1^2 - 3(\sqrt[3]{L}\sqrt[3]{M}) - a_1(\sqrt[3]{L} + \sqrt[3]{M})]^{\frac{1}{2}}$$

Further since $x_1 = -(\sqrt[3]{L} + \sqrt[3]{M}) - \frac{a_1}{3}$,

$$(\sqrt{c^2 + d^2}) = \left[x_1 - 3(\sqrt[3]{L}\sqrt[3]{M}) + a_1 x_1 + \frac{a_1^2}{3}\right]^{\frac{1}{2}}$$

Again since $(\sqrt[3]{L}\sqrt[3]{M}) = \sqrt[3]{LM} = \sqrt[3]{-\frac{q^3}{27}} = -\frac{q}{3}$,

we have: $-3\sqrt[3]{L}\sqrt[3]{M} = q = \left(a_2 - \frac{a_1^2}{3}\right)$;

and so $$(\sqrt{c^2 + d^2}) = \left[x_1^2 + a_2 - \frac{a_1^2}{3} + a_1 x_1 + \frac{a_1^2}{3}\right]^{\frac{1}{2}}$$

$$= [x_1^2 + a_1 x_1 + a_2]^{\frac{1}{2}}$$

Thus the general solution of the third order difference equation is:

$$y_t = A_1 x_1^t + A_2(\sqrt{x^2_1 + a_1 x_1 + a_2})^t \cos(t\theta + \varepsilon)$$

The initial conditions.

Let: $$y_0 = A_1 + A_2 \cos\varepsilon = 1$$

$$y_1 = A_1 x_1 + A_2\sqrt{x_1^2 + a_1 x_1 + a_2}\cos(\theta + \varepsilon) = 1$$

Write $$\sqrt{x_1^2 + a_1 x_1 + a_2} = z.$$

From the first initial condition: $A_1 = 1 - A_2 \cos\varepsilon$

Substituting in the second:

$$(1 - A_2\cos\varepsilon)x_1 + A_2 z\cos(\theta + \varepsilon) = 1$$

$$A_2(z\cos(\theta + \varepsilon) - x_1\cos\varepsilon) = (1 - x_1)$$

$$A_2 = \frac{(1 - x_1)}{(z\cos(\theta + \varepsilon) - x_1\cos\varepsilon)}$$

Thus $$A_1 = 1 - \frac{(1 - x_1)\cos\varepsilon}{(z\cos(\theta + \varepsilon) - x_1\cos\varepsilon)}$$

$$= \frac{z\cos(\theta + \varepsilon) - \cos\varepsilon}{z\cos(\theta + \varepsilon) - x_1\cos\varepsilon}$$

Using these initial conditions the general solution becomes:

$$y_t = \frac{(z\cos(\theta + \varepsilon) - \cos\varepsilon)x_1^t + (1 - x_1)(\sqrt{x_1^2 + a_1 x_1 + a_2})^t\cos(t\theta + \varepsilon)}{(z\cos(\theta + \varepsilon) - x_1\cos\varepsilon)}$$

In the special case where $\alpha = \infty$ and therefore $x_1 = 0$, this becomes

$$y_t = \frac{1}{z\cos(\theta+\varepsilon)}(\sqrt{a_2})^t\cos(t\theta+\varepsilon)$$

$$= \frac{1}{\sqrt{a_2}\cos(\theta+\varepsilon)}(\sqrt{a_2})^t\cos(t\theta+\varepsilon)$$

In the other special case where $\alpha = 0$ and $x_1 = 1$, it becomes:

$$y_t = \frac{(z\cos(\theta+\varepsilon)-\cos\varepsilon)}{(z\cos(\theta+\varepsilon)-\cos\varepsilon)}(1)^t = 1$$

Note on the form of the complex roots x_2 and x_3.

$$x_2 = c + di = -\omega\sqrt[3]{L} - \omega^2\sqrt[3]{M} - \frac{a_1}{3}$$

$$x_3 = c - di = -\omega^2\sqrt[3]{L} - \omega\sqrt[3]{M} - \frac{a_1}{3}$$

The two equations

$$c + di = -\omega\sqrt{L} - \omega^2\sqrt[3]{M} - \frac{a_1}{3}$$

$$c - di = -\omega^2\sqrt[3]{L} - \omega\sqrt[3]{M} - \frac{a_1}{3}$$

can be solved for c and d, so that x_2 and x_3 can be expressed in terms of L, M, a_1 and π.

THE MARGINAL EFFICIENCY OF CAPITAL AND INVESTMENT PROGRAMMING

I

THE expression *marginal efficiency of capital*, which has figured so prominently in the literature since the middle thirties, does not, unfortunately, denote a concept whose meaning and implications have been so carefully construed that no further analysis seems reasonable or necessary. Not only do most writers utilising the marginal efficiency notion tend to oversimplify the problems connected with discounting expected future earnings by neglecting to assign numbers and solve for complex and specific cases, but also they generally fail to recognise the alternative formulations of the concept which must be delineated before any operationally meaningful use can be made of it. Beyond this, it appears that the collection of additional empirical information concerning the respective roles of interest and the marginal efficiency of capital in shaping actual investment programs is both necessary and desirable.

In this paper we propose to deal in some measure with each of these shortcomings, and in the following manner: First, by considering the most commonly used equations for defining the marginal efficiency of capital and their relation to the rate of interest in determining the volume of investment, along with alternative definitions which have appeared from time to time in the literature.

Second, by relating this analysis to the more important results of a survey of investment-planning practices conducted by the authors. This survey was conducted by means of questionnaires mailed to 175 manufacturing firms, including companies engaged in the refining of petroleum products. These firms were selected at random from 644 corporations whose securities are actively traded on the New York Stock Exchange.[1] The Stock Exchange listing was used because we wished to obtain information from large firms which are experienced in investment financing. The survey does not purport, therefore, to be representative of all firms, but only those which might be presumed to be most knowledgeable concerning the marginal efficiency of capital concept. Completed questionnaires were returned by 33%[2] of

[1] In addition, copies of the questionnaire were sent to public-utility companies in the water, gas, electric and communications fields for the purpose of making a comparison of public-utility and manufacturing (including petroleum refining) investment planning. Replies were received from seventeen firms comprising over 20% of the utility companies whose securities are actively traded on the New York Stock Exchange. Since the survey questionnaire was drawn up primarily for completion by manufacturing corporations, it was in some respects unsatisfactory for eliciting information concerning public-utility operations. The main comparisons which can be made between the utilities and the other firms surveyed are: (1) heavy reliance on *external* sources for new capital; (2) inclusion of depreciation in rate-of-return calculations as prescribed by law; (3) longer estimated lives of plant and equipment; and (4) less frequent use of pay-out period methods in selecting investments.

[2] Fifty-seven firms.

the corporations sampled. This response compares favorably with that reported by other questionnaire surveys of business firms.[1] The survey must be interpreted with some reservation, of course, since the statistical confidence limits for the resulting data are rather broad.

Investment planning has been the subject of some prior investigation and comment. It is emphasised that the present study is *not* a comprehensive analysis of planning practices. The questionnaire was confined to: (*a*) determinants of future income; (*b*) degree of detail with which future returns are estimated; (*c*) sources of funds for new investment; (*d*) relevance of the market rate of interest in profits estimates; (*e*) evaluation of alternative investments, both internal and external to the firm; and (*f*) what consideration appears to be given to time as a factor affecting the profitability of investment.

The firms responding range in size from five employing less than 2,000 persons to several with more than 50,000 employees. In tabulating the results, the respondents were separated into: (*a*) those with less than 7,500 employees, and (*b*) those with more than 7,500 employees. Twenty-five corporations were in the former group and thirty-two in the latter. Generally speaking, the differences between the two groups were not large. Where they are worth noting, differences are reported in the subsequent analysis of the results.

Finally, comment is made upon the methods for calculating the discounted present value of future income, including a suggested procedure for calculation.

II

Numerous equations for rigorously structuring the marginal efficiency concept have been devised, but subtle variations in their meanings and usefulness ought at all times to be recognised. Perhaps the most widely used version of all is that which Professor Hansen employs [2] to discount the expected future earnings of an asset down to its current supply price (*i.e.*, replacement cost, not market price).[3]

If C be the cost of a capital good, and R_1, R_2, . . . R_n represent the successive anticipated annual earnings, then the rate of discount, r, appears as follows:

$$C = \frac{R_1}{(1+r)} + \frac{R_2}{(1+r)^2} + \ \cdots \ \frac{R_n}{(1+r)^n} \quad . \quad . \quad . \quad (1)$$

Here r is the counterpart of Keynes' " precise " definition of the marginal efficiency of capital.[4] At this juncture in most treatments of these calcula-

[1] For example, the Oxford Research Group reported a 25% response on their study of the influence of the interest rate. R. S. Sayers, " Business Men and the Terms of Borrowing," *Oxford Economic Papers*, No. 3 (February 1940), pp. 23 ff. W. J. Eiteman and G. E. Guthrie, " The Shape of the Average Cost Curve," *American Economic Review*, Vol. XLII (December 1952), p. 836, reported a 36·6% response in a survey for which they employed a somewhat simpler questionnaire than that used for the present study.

[2] Alvin H. Hansen, *Business Cycles and National Income* (New York: W. W. Norton, 1951), pp. 125 ff.

[3] John Maynard Keynes, *The General Theory of Employment, Interest and Money* (London: Macmillan, 1936), p. 135.

[4] *Loc. cit.*

tions concerning investment profitability, one of two procedures is generally observed; either r is compared directly to the rate of interest, i, or an "asset value" (*i.e.*, "demand price") equation is constructed. Professor Hansen, observing the latter course, uses:

$$V = \frac{R_1}{(1+i)} + \frac{R_2}{(1+i)^2} + \cdots \frac{R_n}{(1+i)^n} \quad . \quad . \quad . \quad (2)$$

With i representing the rate of interest, $V > C$ in the same proportion as $r > i$.[1] This is perfectly true, but it would seem both proper and relevant at this point to provide a numerical example of an actual application of the equations; and this suggestion does not refer to, nor is it satisfied by, over-simplified examples of the form:

$$\$3{,}000 = \frac{\$1{,}100}{1{\cdot}10} + \frac{\$2{,}420}{(1{\cdot}10)^2} \quad . \quad . \quad . \quad . \quad . \quad (3)$$

Though no more helpful, the marginal unit of investment is sometimes expressed as:

$$\Sigma \left\{ \frac{Q_n}{(1+r)^n} \right\} = C \quad . \quad . \quad . \quad . \quad . \quad . \quad (4)$$

"Where Q_n is the expected quasi-rent of the nth year, r is the rate of interest expressed as a fraction of unity, and C the marginal cost of the capital good." [2]

To handle the similar problem, Professor Shackle utilises ". . . an exponent μ such that the value of the instrument,

$$v = \int_0^\infty c(x) e^{-\mu x} \, dx \quad . \quad . \quad . \quad . \quad . \quad . \quad (5)$$

is equal to u its purchase price." [3]

A last variation that may be mentioned is Professor Sanderson's expression for *average rate of return over cost*, i:

$$K = \frac{a_1}{1+i} + \frac{a_2}{(1+i)^2} + \cdots + \frac{a_n}{(1+i)^n} \quad . \quad . \quad . \quad (6)$$

Here K refers to the total amount to be invested in the present, while $a_1, a_2 \ldots a_n$ represent ". . . net returns at the end of years 1, 2, . . . n . . ." [4]

In general, these formulations are rather abstract.[5] This is partially the consequence of numerous complications in the marginal efficiency con-

[1] Hansen, *op. cit.*, p. 125.

[2] P. T. Bauer and P. R. Marrack, "Depreciation and Interest," ECONOMIC JOURNAL, Vol. XLIX (June 1939), p. 237.

[3] G. L. S. Shackle, "Interest Rates and the Pace of Investment," ECONOMIC JOURNAL, Vol. LVI (March 1946), p. 11.

[4] G. B. Sanderson, "A Note on the Theory of Investment," *Economica*, Vol. VIII (May 1941), pp. 178–9.

[5] Some authors, of course, abstract because of the nature of the material, or purposely. For an example of the latter, see the analysis of the "abstract relation of the yield of capital assets to interest, with especial reference to the level of interest in a 'stationary' state," by T. Morgan, "Interest, Time Preference, and the Yield of Capital," *American Economic Review*, Vol. XXXV (March 1945), pp. 81–98.

cept. For example, even the simplifying and " intuitively obvious " assumption that, *ceteris paribus*, the rate of interest and gross investment (the dependent variable) are inversely related has been questioned by Benjamin Caplan, who, after defining gross investment as net investment plus reinvestment, declares:

> " A change in the rate of interest operates on reinvestment by bringing near or postponing the *abandonment* and *premature* abandonment of existing capital. An increase in the interest rate tends to increase in general the abandonment of existing capital and also the premature abandonment of those capital goods which are to be replaced by goods of intermediate durability. But though the decision to abandon is hastened by the increase in the interest rate, this does not *automatically* swell the flow of reinvestment. It may or may not." [1]

In Mr. Caplan's schema the rate of interest operates primarily through its effect upon the opportunity cost of carrying old capital on the books when working capital could otherwise be released via returns from salvage on abandoned or prematurely abandoned capital.[2]

Perhaps the most notable departure from Keynes' marginal efficiency of capital concept is that of Dr. C. F. Roos, who claims that his ". . . studies indicate that actual investment lags returns or profits rather than leads them. Thus, past rather than future profits determine investment, and so Keynes has overemphasized the role of expected profits and consequently produced a somewhat unrealistic idealized theory." [3]

Formally, the interest rate is a determinant of investment in Keynes' theory,[4] but the implication is made that its influence is more than cancelled out by the effect of business expectations resulting from anticipated changes in the levels of employment and effective demand.[5] Later writers have been more specific on this point than Keynes and have questioned that interest-rate changes have any influence whatever upon the volume of investment. Professor F. A. Lutz is of the opinion that in most areas of the economy the interest rate may have no more than an indirect effect upon investment by altering " the readiness of financial institutions to grant credit or to float bonds and stocks, so that the interest rate may influence the volume of investment even without changing the profit calculations of entrepreneurs." [6] The study of British corporations by the Oxford Economic Group supports Lutz's view that only in public-utility operations and residential construction

[1] B. Caplan, " Reinvestment and the Rate of Interest," *American Economic Review*, Vol. XXX (September 1940), p. 561.

[2] Another technique relating salvage value and the interest rate is discussed by A. D. Knox, "The Acceleration Principle and the Theory of Investment," *Economica*, Vol. XIX (August 1952), p. 285. Knox points out the practical problem of estimating *ex ante* the economic life of new equipment. He also notes that the principal reason for the widespread use in business of rough-and-ready methods of estimating profits expected from new investment is the extreme uncertainty which beclouds the remote future. Professor Joel Dean takes up the analysis of this problem where Knox leaves it. Dean's views are discussed in greater detail on p. 668 below.

[3] C. F. Roos, " The Demand for Investment Goods," *American Economic Review*, Vol. XXXVIII (May 1948), Suppl., p. 313. [4] Keynes, *op. cit.*, p. 183. [5] *Ibid.*, p. 185, also p. 164.

[6] F. A. Lutz, " The Interest Rate and Investment in a Dynamic Economy," *American Economic Review*, Vol. XXXV (December 1945), p. 830.

is the interest rate of direct significance.[1] Ezekiel, in his study of American corporate investment, also found the interest rate to be without apparent influence.[2] Recent economic opinion appears to agree with the conclusion that:

> "The marginal efficiency of a new investment to a businessman is likely to vary widely, from perhaps 100 percent per year or more in the warmth of optimism about a new process, new synthetic, or new market down to minus 30 percent from the *best* investment open in the gloom of deep depression. . . . A fluctuation of interest rates within the range we have experienced in recent decades, say 6 to 2 percent, is of secondary importance." [3]

There also are other reasons for the evident unimportance of the market rate of interest. One of these is the noteworthy independence of large enterprise from the capital-funds markets. Internal sources (retained earnings and depreciation or depletion allowances) supplied 64% of total corporate capital requirements in the period 1946–53 inclusive.[4] Of the firms responding to our questionnaire, 85% reported that internal sources were of principal importance in financing plant and equipment purchases. The other respondents were evenly divided between: (*a*) those firms reporting primary dependence upon external financing (borrowing and stock issues), and (*b*) those about equally dependent upon both internal and external sources. All of the firms mainly dependent upon external sources were in the group with under 7,500 employees. The decreased relative importance of the capital markets in recent years for business-financing purposes can scarcely have failed to diminish the significance of fluctuations in the market rate of interest as either a deterrent or incentive to investment.[5]

A large number of companies are indifferent to the opportunity cost of capital. Professor Dean comments that salaried top executives, who have little to gain from higher profits, but much to lose from corporate reorganisation should plans financed with outside capital misfire, are reluctant to borrow or even to raise funds from equity sources.[6] No matter what the opportunities, some companies are firmly unwilling to borrow.[7] On the other hand, there is a strong tendency to retain a substantial part of income, even though the profits which might be realised from internal use fall substantially below the going rates of return elsewhere. Dean concludes that, in theory, the market cost of capital should signal: (1) when dividends should restrict internal accumulation and use of funds, and (2) "when recourse should be had to external supply." [8]

[1] H. D. Henderson, "The Significance of the Rate of Interest," *Oxford Economic Papers*, No. 1 (October 1938), pp. 4–6.

[2] Mordecai Ezekiel, "Statistical Investigations of Saving, Consumption, and Investment," *American Economic Review*, Vol. XXXII (June 1942), p. 283.

[3] Theodore Morgan, *Income and Employment*, 2nd ed. (New York: Prentice-Hall, 1952), p. 170.

[4] Northern Trust Company, *Business Comment*, November 1954, p. 4.

[5] The logic of grouping equity issues with debt issues in asserting that external sources of funds are more affected by interest-rate considerations than internal sources is suggested by the observation of Joel Dean that in the modern corporation dividends "are a kind of interest income (although more uncertain than contractual interest)." See his *Capital Budgeting* (New York: Columbia, 1951), p. 40. [6] *Ibid.*, p. 55. [7] *Ibid.*, p. 53. [8] *Ibid.*, p. 70.

Our survey disclosed, however, that the market cost of funds is widely disregarded in business capital planning. Fifty-nine per cent of the respondent firms indicated that they do not consider the market rate of interest in calculating the estimated returns from a proposed investment in plant or equipment to be financed with internally supplied funds. This appears to be especially significant in view of the heavy proportion of large firms which depend primarily upon internal capital, as noted earlier. Information also was obtained on the circumstances under which the respondents would consider new types of investment. Two companies, including one which has a large business in government contracts and therefore favors " diversification at a low rate of return as insurance " against the vicissitudes of its main operation, indicated they would not expect a new product to earn as high a return as an established product. Other firms, however, wanted returns of 50 and 100% greater on a new product, and some companies were obviously not interested in a new product in any circumstances.[1] One company reported that it would not be interested in a new product " unless we had sufficient facilities for the manufacture of our present products to protect our industry position." Perhaps this reservation is in the minds of many executives.

Companies were also asked how much larger the return would have to be than that on their present operations before they would consider investment in another company over which they would not have " substantial management control." Significantly, the firms showing the least reluctance to consider this proposition were companies already having highly diversified operations. Fully 22% commented that they were not interested without management control. One company specified that it would not consider such an investment without at least a " 70% " stock interest in the other company. The answers from several other companies suggested that they, too, regarded management control as a primary factor. One cannot take particular exception to this policy. The companies surveyed were manufacturing firms, not investment trusts. At the same time the results showed a variety of emphases, and especially the great importance to management of being able to control absolutely the use of corporate funds as well as to have control of the sources from which funds used internally are obtained.

Another reason is given by Lawrence Klein. He claims that the methods typically used by firms to discount for risk greatly minimise the importance of the interest rate.[2] It is well known that the " pay-out " period, which is the number of years required for an asset's earnings to recover its initial cost, or an alternative formulation amounting to virtually the same thing (the percentage of the initial cost recovered in earnings each year), is the most generally used method for evaluating prospective investments. In our sur-

[1] Higher earnings requirements for new investments appears to be important as a way of offsetting uncertainty in estimates of future income, since the calculation of all anticipated costs and returns is susceptible to considerable error. See Lloyd Reynolds, *The Structure of Labor Markets* (New York: Harper, 1951), p. 179.

[2] Lawrence Klein, *The Keynesian Revolution* (New York: Macmillan, 1947), pp. 64–5.

vey 85% of the firms answering the questions reported using this method.[1] Klein's observation is based upon the shortness of this period. According to the McGraw-Hill survey of capital-spending plans conducted in 1948, three out of four manufacturing companies expect new equipment to pay out in five years or less.[2]

The pay-out method has been strongly criticised in recent years, and apparently this criticism has had some effect, inasmuch as a small number of the firms contacted in the authors' survey had reservations about the method, and one large company stated specifically that it had discontinued using it.[3]

One of the strongest critics of the pay-out method is the Machinery and Allied Products Institute (" MAPI "), the leading trade association in the machine-tool field.[4] Ordinarily, application of the pay-out method entails a cut-off point—either a maximum number of years for cost recovery or a minimum percentage of original cost to be earned each year. All projects requiring a longer period (or expected to return a lower percentage of initial cost) are summarily rejected. According to MAPI, executives who use such a device are " shooting blind." [5] " Different industrialists have their favorite pay-off or return requirements as they have their favorite cigarettes." [6]

Dean calls the pay-out period " a misleading measure of capital productivity." [7] " Capital productivity should usually be measured by earnings over the whole life of the asset. . . ." [8]

[1] All things considered and the subsequent criticism notwithstanding, the pay-out method might at least be defended as better than no method at all, for it reduces to a system—albeit too simple a one—information which it might otherwise not be possible to compare in any comprehensive fashion. If a group of small-sized firms were surveyed it is rather likely that they would show less reliance upon the pay-out method, and would not offer any systematic substitute. This conclusion seems warranted on the basis that small firms are less specialised and, therefore, probably will not accord as much recognition to the problems of investment programming at the staff level.

[2] *Business Week*, January 22, 1949, p. 59. However, according to M. G. de Chazeau, the mere fact that the making of pay-out calculations is very widespread among large firms is not a necessary sign that these materially affect the final choices from among investment alternatives, which are said still to depend mainly on " less tangible " and " more variable " considerations of judgment. de Chazeau, " The Individual Firm, " in de Chazeau, ed., *Regularization of Business Investment* (Princeton: Princeton University Press, 1954), p. 95.

[3] Five per cent of the firms definitely stated that they do not use the method. All of these are in the group with 7,500 and more employees.

[4] See their *MAPI Replacement Manual for the Attainment of a Dynamic Equipment Policy* (1950), 78 pp. Also George Terborgh, *Dynamic Equipment Policy* (New York: McGraw-Hill, 1949), 290 pp., upon which the *MAPI Manual* is based.

[5] MAPI, *op. cit.*, p. 4.

[6] *Ibid.*

[7] *Op. cit.*, p. 22.

[8] *Ibid.*, p. 21. All of the adverse effects of present methods of investment decision are not, however, internal to the firm or industry. Mr. Lewis Mumford, the well known writer and city planner, has recently complained against the attitude that " Money is not interested in looking further ahead than the next five years." In his opinion, this view leads to the creation of specific properties which may be inimical to the long-run public interest in a co-ordinated, efficient and æsthetic urban environment. Lewis Mumford, " The Sky Line," *New Yorker*, March 19, 1955, p. 85.

Pay-out periods contrast sharply in length with the estimated service lives of plant and equipment assets. Terborgh, for example, indicates that fifteen- and twenty-year service life periods, in that order, are the periods most commonly recommended by the Bureau of Internal Revenue for charging off depreciation and obsolescence (Bulletin F).[1] The actual useful life of an asset, however, may be intermediate between these two extremes. In the case of machine tools, the average depreciation period is reported to be 20·7 years and the pay-out period only three years, while the actual period for which the machinery can be used before obsolescence is from seven to ten years.[2]

Dean, as a practical matter, believes that the income productivity of an asset might well be ascertained on the basis of a period shorter than the depreciation period, the prime useful life of the asset. He thinks that the relevant period may be that required for an asset to become obsolete in its prime use—the intermediate period between pay out and total useful life noted above, even though it may continue to yield a value product subsequently in other capacities inside or outside the firm.[3] In other words, the appropriate time period for estimating the profitability of a given capital asset is specifically that period during which it will probably be employed in the exact use for which it is purchased. Its cost, according to this reasoning, is the supply price, C, minus resale value.

The marginal efficiency of capital, it was noted earlier, has been variously regarded as being: (1) gross, or (2) net of depreciation. Dean favors the latter,[4] and the difference between C and the resale value will consist of accrued depreciation for the period (user cost) and a larger proportion of the total obsolescence which the asset will incur before it is finally scrapped. This is, then, a method for writing off a large part of the obsolescence during the early part of the total life of the asset, which is also achieved by the constant-percentage method and by use of the short pay-out period.

While the foregoing may suggest useful criteria for establishing the appropriate investment period in a given situation, there is not available a compilation of estimated time periods which can serve as a first approximation, as does Bulletin F in the case of depreciation rates. There would appear to be some difficulty, therefore, in establishing the length of the useful life according to Dean's definition. This should not, however, deter a firm from conjecturing about the length of prime useful asset life.

The main impetus for the use of the pay-out method is the uncertainty of future returns. Our survey reveals that, in estimating future profits, factors which are exogenous to the firm tend to be more important than factors

[1] George Terborgh, *Realistic Depreciation Policy* (Washington: Machinery and Allied Products Institute, 1954), p. 81. These figures do not, of course, reflect the present great importance of five-year "emergency" amortisation as provided for in the Internal Revenue Act of 1954 (*U.S. Stats.*, 1954, Vol. 68A, p. 52) and in earlier legislation.

[2] L. D. Bethel and others, *Industrial Organization and Management*, 2nd ed. (New York: McGraw-Hill, 1950), p. 441.

[3] Dean, *op. cit.*, p. 22.

[4] *Ibid.*, pp. 22–3.

over which it has more direct control.[1] These factors are, of course, the less predictable. The very short average pay-out period may provide a rate of discount against these uncertainties which is much too steep because it overshadows other relevant quantities which should be taken account of in the capital-rationing process. It contains an inherent bias in favor of assets with a high rate of return in their early years and against those investments which may yield truly greater returns over a longer period but at a constant rate, or those which will become most productive of income at a subsequent date. It is not merely that the pay-out method is " crude," [2] it is also inappropriate for accomplishing the maximisation of income in the long run. The pay-out method is a device for " cash budgeting," but since it does not measure profitability is not suitable for capital budgeting.[3] Dean and several other writers would prefer to discount for the uncertainty of future returns by means of probability multipliers applied to the anticipated earnings of each case for each year, rather than by the use of the cut-off date or rate.[4]

And Shackle, concentrating more heavily upon the unpredictable element of technological change, maintains that:

> ". . . the strength of the influence of interest-rates on the pace of investment in those kinds of equipment which are subject to the hazards of invention and fashion can be rendered negligible by an allowance, of a size such as enterprisers themselves imply that they adopt, for doubt concerning the correctness of the ' best guess ' they can make, on available knowledge, as to the size of future net returns from such equipment; provided the *form* of this allowance is that of a rate used for discounting in the same manner as the interest-rate; or in some other strongly-increasing function of futurity." [5]

An effort was made to ascertain in what detail estimates of the profitability of new investments are projected. The survey showed that 45% of the responding firms confine their estimates of new-asset earnings to a period of five years or less. The answers of some of these firms indicate that the length of the pay-out period employed also determines the interval for which earnings estimates will be made. Approximately the same percentage of the respondents indicated that they typically estimate for periods longer than five years. A large proportion of these companies reported that the useful

[1] Firms were queried on whether or not their estimates of future earnings from new investments take the form of a constant annual rate or are variable over time to take account of anticipated developments which will affect annual profits. Fifty-eight per cent of the respondents reported making variable annual estimates. These were asked to specify their reasons for using variable estimates. Twenty-nine per cent of them indicated that some assumed change in general business conditions is the principal reason accounting for variations. Another 29% specified an anticipated change in the competitive conditions within their industries. Other main reasons given were: a change in productivity 14%; use of a depreciation formula (constant percentage or service unit) which writes off different amounts of value each year 12%; and anticipated change in technology affecting the usefulness of the asset 16%.

[2] *Op. cit.*, p. 27. [3] *Ibid.*, pp. 24–5.

[4] *Ibid.*, pp. 29–31. Also, compare with Fellner's concept of the safety margin. W. Fellner, *Competition Among the Few* (New York: Knopf, 1949), pp. 152–7; and the " caution-factor " of Sanderson, *op. cit.*, pp. 180 ff. [5] Shackle, *op. cit.*, pp. 16–17.

life of the asset is the relevant factor establishing the length of time over which they estimate future returns.[1]

Previously, mention was made of the conclusion of C. F. Roos that investment depends upon the performance of profits in the preceding period.[2] The low horizon of most business calculations concerning future returns probably limits these to a considerable extent to present experience or that of the recent past. While our survey showed that 37% of responding firms make studies of the anticipated market the basis of their determinations regarding the profitability of investment proposals, 32% stated that their studies were to a considerable degree based upon extrapolations of present (or immediately past) performance of profits. A variety of methods were reported by the other 3% of the firms. It seems quite possible that detailed inquiry would show that the dependence of investment plans upon the record of earnings in the immediate past is even more widespread than the above findings indicate.

All things considered, the discussions in the literature of the appropriate handling of prospective yield are not bereft of utility. However, they leave unanswered the question of "what's to be maximised?" Is it: (1) the internal rate of return (*i.e.*, the discount rate that would equate the current value of the stream of costs of an asset to the current value of the stream of receipts from the same asset); (2) the difference between the present value of the cost and revenue streams, both discounted at the going rate of interest; or (3) the rate of profit over cost (found by dividing the present value of the revenue stream—determined by discounting the future revenue stream at the market rate of interest—by the present value of the cost stream, discounted similarly)?[3]

The consensus of opinion among economists would *appear* to indicate that it is the difference between the present value of the cost and revenue streams (*i.e.*, total profit) that is maximised.[4]

[1] Among the comments made on this question was that of one firm which said its estimates were for the pay-out period plus one or two years, or the period for which funds have been borrowed in the case of assets purchased with outside capital. Another said its calculations are for the period required to reach maximum output levels, and one company working on government contracts (not the same company cited previously) stated that its estimates are for the period of the contract (equipment costs being fully amortised over the contract period). [2] *Loc. cit.*

[3] F. A. Lutz, "The Criterion of Maximum Profits in the Theory of Investment," *Quarterly Journal of Economics*, Vol. LX (November 1945), pp. 56–77.

For a further analysis of the maximisation problem, but one which omits the "rate of profit over cost" aspect, see C. Hildreth, "A Note on Maximization Criteria," *Quarterly Journal of Economics*, Vol. LXI (November 1946), pp. 156–64.

And finally, attention should also be drawn here to one of the earliest and most competently handled surveys of the more specific issues implicit in business planning for maximum profit under conditions of uncertainty. Cf. A. G. Hart, "Anticipations, Business Planning and the Cycle," *Quarterly Journal of Economics*, Vol. LI (February 1937), pp. 273–97.

[4] And, in most instances, is what *ought* to be maximised. Certainly Professor Lutz implies this, although he carefully notes that Böhm-Bawerk, Wicksell, Knight, Akerman and Boulding stress the importance of maximising what amounts to the *internal rate of return*. Lutz, "The Criterion of Maximum Profits in the Theory of Investment," pp. 56–61, 76–7.

Of course there is always the possibility that a monopolistically-empowered firm may prefer to stop short of full profit maximisation. Cf. Fellner, *op. cit.*, pp. 142 ff.

Economists have failed, however, to communicate this conclusion to those who are actually engaged in business investment planning. In our survey we found that the respondents always expressed a preference for the shorter-term investment if all other conditions are equal, but few companies revealed any awareness of the discount problem as such or actually employed some explicit means for formally taking account of the effect of time upon the value of expected returns from future years.[1] In fact, of the companies surveyed, only four indicated a definite familiarity with the concept of discounting future returns, and only two really appear to be practicing discounting now. Apart from the effects of depreciation and obsolescence, a majority of firms appeared to take no formal account of the passage of time.

Presumably, in these profit-maximisation formulations the implications of the imperfectly competitive model are tacitly understood. None the less, the importance of the assumption of a negatively sloped demand schedule is so critical that it should be singled out for special consideration. Care must be exercised in order to avoid mistaking profit on a marginal increment of capital alone and of itself for the net contribution to *total profit* created by that same incremental capital. For as soon as one departs from the assumption that the firm's marginal revenue schedule is infinitely elastic, these two quantities will differ—net contribution to total profit will be the lesser. That is to say, the *marginal revenue product* created by the additional investment is less than the *value of the marginal product* created thereby.[2]

Thus, it is not enough to inquire as to the relation between the rate of interest, i, and the marginal efficiency of capital, r, and to ascertain that $r > i$. In the circumstances induced by the downward-sloping demand schedule, the significant number (or numbers) to be discounted (*i.e.*, R_1, R_2, . . . R_n in equation (1)) to current supply price, and to be divided by the rate of interest (as in equation (2)), is that which represents the new asset's contribution to total profit (on existing, plus incremental, capital), rather than net earnings on new capital alone without regard to the effect of these earnings on yields from already existing facilities.[3]

The only respect in which our study sheds light upon this aspect of profit maximisation is the observation noted earlier that corporate estimates of future profits are greatly influenced by expected changes in competitive conditions.

Neither the economic theorists nor the business economists who have

[1] Of course there is a form of " implicit " discounting for time in the pay-out method of investment selection, since prospective assets are judged according to the swiftness with which their cost can be recovered.

[2] The model is further complicated by all those issues associated with the mutual indeterminacy of price-output policies among oligopolists, and by the more specific problem of bilateral oligopoly. Fellner, *op. cit.*, pp. 9 ff.

[3] Moreover, it should be made clear that R includes depreciation, as well as surplus, in the Keynesian formulation. Cf. Alvin H. Hansen, *A Guide to Keynes* (New York: McGraw-Hill, 1953), p. 122.

Professor Hamberg, in his construction, excludes depreciation, yet applies the label " marginal efficiency of capital." D. Hamberg, *Business Cycles* (New York: Macmillan, 1951), pp. 62–3.

recognised the importance of the discount problem have suggested how it might be handled in practice.[1] Yet, according to Dean:

> "Discounting the stream of capital earnings to take account of the diminishing value of distant earnings is an integral part of the theory of capital value. . . . When the economic life of assets is short or fairly uniform, when estimates are necessarily rough, and when uncertainty rises steeply in the distant future, this refinement is not worth its complexity cost. On the other hand, discounting has practical importance when there are distinctive time patterns of the income streams of different assets and when the rate of discount (logically the firm's cost of capital) is high . . ." [2]

According to Terborgh, discounting for futurity "requires that all present and future magnitudes involved in replacement analyses be brought to a common time reference for comparison." [3] And, "Interest works both forwards and backwards. It is not only an increment to past magnitudes, it is a discount for future magnitudes. . . . Everything must be brought to a common time reference by means of the interest rate." [4]

III

These comments, however, furnish no clues to the unsophisticated reader as to what method might best be employed to effectuate the practice of discounting in a firm's capital programming.[5] The obvious justification for such failure is, of course, apparent in Dean's comment concerning the quality of the estimates and the sharp increase in the uncertainty of returns from future years.

Despite the validity of these arguments for treating discounting as a parenthetical aside on the subject of investment programming, the present trend toward the development of more refined and detailed estimates suggests that heretofore neglected areas should be explored further. It is widely believed that the automation of administrative procedure is approaching in many large firms. The implication has been drawn from this, that while the primary justification for introducing electronic methods in administration will be cost savings which can be realised in the performance of certain routine clerical tasks, a potential capacity is likely to be created which will

[1] The most explicit study by a business firm recognising the effect of time upon investment decisions which we have seen is American Telephone and Telegraph Company, Dept. of Operation and Engineering, *Engineering Economy* (1952), 75 pp. and appendices. This study, however, assumes the rate of return or discount to be known and confines its attention to the determination of either: (1) present worth, or (2) future worth by use of conversion tables. Such an emphasis, which is the opposite of that in our study, is appropriate in regulated utility operations, where the rate of return for most, although not all, new investment expenditures is fixed.

[2] Dean, *op. cit.*, p. 22.

[3] Terborgh, *Dynamic Equipment Policy*, *op. cit.*, p. 43. [4] *Ibid.*, p. 160.

[5] Another writer, Billy F. Goetz, *Management Planning and Control* (New York: McGraw-Hill, 1949), p. 183, is slightly more explicit: Discounting, he states, "involves estimating dates at which each cash receipt and disbursement is expected to occur if the plan with which it is associated is adopted, followed by application of compound interest formulas to reduce each program to a comparable basis."

make it feasible to expand greatly the firm's research for purposes of improved administrative control.[1] It has been estimated that in the future the output of the computer system of a large firm will be " hundreds of times " the present output of " paper work "; " in fact, current record keeping and other clerical activities will represent less than 1% of its activity." [2]

It seems, therefore, that there is a likelihood of rapid further development of capital programming methods. Computation of the rate of return on a basis that takes account of the time factor (discounting), however, need not await programming on a computer if estimates of net dollar returns have already been established by the firm. Indeed, problems of this type may be much more expeditiously handled with a desk calculator. Using equation (1), the procedure for programming the calculation of the discounted (or exact) rate of return on investment is as follows:

The procedure consists of two steps: first, obtaining two approximate values for r and, second, interpolation for a more accurate intermediate value which will be the final answer. The objective of this calculation is to obtain a value, S, which is as nearly equal as desired to the supply price of the asset, C.

1. Commencing with the return in the last year, R_n, and multiplying this term by x_0, which is 1 minus an assumed r, and then this product and all successive products plus the R for each year preceding also by x_0, the procedure is continued until completed for the R's of all years, n through $n - n + 1$.

$$
\begin{aligned}
&R_n \\
&R_{nx_0} + R_{n-1} \\
&(R_{nx_0} + R_{n-1})\, x_0 \\
&[(R_{nx_0} + R_{n-1})\, x_0 + R_{n-2}]\, x_0 \\
&\{[(R_{nx_0} + R_{n-1})\, x_0 + R_{n-2}]\, x_0 + R_{n-3}\}\, x_0 \ . \ . \ .
\end{aligned}
$$

2. When S_0, the approximation to C, is obtained, the procedure is repeated using a different value for x, which is either higher or lower than

[1] Roddy F. Osborn, " *GE* and *UNIVAC*; Harnessing the High-speed Computer," *Harvard Business Review*, July–August 1954, p. 109, reports that the General Electric Company commenced computer operations at its Appliance Park plant, Louisville, on the basis of a saving of $500,000 in clerical labor annually on just four standard operations. Osborn states that there will be plenty of free time on the computer system, because these four operations would occupy the equipment for only one-half of one shift when the plant is operating at capacity.

And, according to R. F. Clippinger, " Economics of the Digital Computer," *Harvard Business Review*, January–February 1955, p. 81, there are definite economies of scale to be realised in computer operations, or, as he puts it, " the manpower capacity tends to increase faster than the cost of the computer."

For other discussions of the subject see P. B. Laubach and Laurence E. Thompson, " Electronic Computers: A Progress Report," *Harvard Business Review*, March–April 1956, pp. 120 ff. Also, the American Management Association's Office Management Series, Nos. 131 and 136 (1952? and 1954?), *Electronics in the Office: Problems and Prospects* and *The Impact of Computers on Office Management*. In the last mentioned publication, W. W. Smith (" The Computer in Industry," p. 8) points out that in the GE Appliance Park operations computer use has made possible the calculations of the budgeted net income for 37,000 possible combinations of selling prices, production model mixes and price allowances in one department alone which were deserving of analysis.

[2] Clippinger, *op. cit.*, p. 88.

x_0 as S_0 is higher or lower than C. Given these two approximations to C, S_0 and S_1, a better answer may be obtained by the method of proportional parts, which is

$$S_2, \text{ a better approximation to } C, = \frac{C - S_0}{S_1 - S_0} d + (1 - x_0),$$

where d is the difference between $(1 - x_0)$ and $(1 - x_1)$.

Ordinarily, this result will be sufficiently accurate for obtaining a discounted rate of profit on contemplated investments. However, further refinement could be obtained in the answer by means of Newton's Method.[1] The advantage is that each of the approximations in part 1 may be carried through in the calculator without any need for writing down partial results or clearing the machine. Since the method of proportional parts is accurate to four places, its use is more than sufficient to cope with the usual discounting problem.

IV. Conclusions

1. The marginal efficiency of capital is useful both as a theoretical refinement and as a practical step in measuring the relative desirability of different investment opportunities.

2. Methods of investment programming are still fairly crude in most firms, with programs being closely dependent upon: (*a*) judgment, and (*b*) performance in the present and immediate past. The discounting problem is scarcely recognised, and is even more rarely dealt with in practice.

3. The literature has not treated the discounting problem sufficiently, in view of the fact that the whole subject of capital programming is expected to become a much more important part of management practice in the not too distant future.

4. A simple procedure for handling the discounting problem is provided in the expectation that (*a*) it can be usefully applied, and (*b*) that it will serve as a base for further discussion and analysis.

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[1] One of the most straightforward treatments of the use of the proportional parts method and Newton's Method in solving interest problems is F. C. Kent, *Mathematical Principles of Finance*, 2nd ed. (New York: McGraw-Hill, 1927), pp. 23–8, 136–9, *et passim*. Also F. C. and M. E. Kent, *Compound Interest and Annuity Tables* (New York: McGraw-Hill, 1926), pp. 2–3, 8–11. Also see E. B. Skinner, *The Mathematical Theory of Investment* (Boston: Ginn, 1913), pp. 109–11. A more advanced discussion of these and other interpolation methods is D. E. Littlewood, *A University Algebra* (Melbourne: Heinemann, 1950), pp. 178–86.

PRODUCTIVITY, TRADE BALANCE AND INTERNATIONAL STRUCTURE[1]

In recent years there has been a good deal of fresh thinking on the relationship between productivity trends and the balance of trade. This has produced a number of highly interesting and provocative theories, but inevitably also the threat of some confusion.

The real world situation which the recent models[2] have sought to illuminate is, of course, the dollar shortage, a predicament which most of them agree in regarding as a sympton of certain differentials in performance between America and the rest of the world, whether in current *levels* of productivity or in the *rate* of economic progress through time.[3] Confining ourselves to the second type of argument, which alone appears to have received analytic treatment of a rigorous sort, we may follow Mr. H. G. Johnson in dividing the protagonists into two groups: those who emphasise the international burden of adjustment due to a higher *overall* rate of progress in one of the areas concerned, and those who stress the real losses arising from an unfavourable *distribution* of the superior productivity gains between industries of varying orientation towards foreign trade (export industries and import-competing branches).

The main arguments of the first type of theory have found embodiment in a model of great simplicity and elegance by Mr. H. G. Johnson,[4] while the essence of theories of the second type has been most clearly stated in Professor Hicks' inaugural lecture.[4] Professor Hicks' contention, it will be remembered, was that all would be well for the rest of the world so long as the progressive country's productivity trends were "export biased," but that grave difficulties, monetary or real, would be bound to arise when its gains came to be concentrated upon import-competing industries.

My chief concern in this article is the reconciliation of the two models in a slightly generalised scheme which, though falling painfully short of either in conciseness and intellectual charm, may help to restore to view a number of skeletons still lurking in various cupboards. In making such an attempt I am well aware that all that can be hoped for is a relaxation of the narrowest

[1] My thanks are due to Sir Donald MacDougall for helpful suggestions concerning both matter and form.

[2] Since this article was submitted a number of further important contributions have appeared, notably Mr. H. G. Johnson's article in *The Manchester School of Social and Economic Studies*, May 1955. It is regretted that no account could be taken of them in this paper.

[3] It may be well at this point to disclaim any notion that America is, of necessity, the faster in the rate of productivity growth through time, although such a presumption may well have inspired some of the early models in the field. It is, however, in no way essential to their validity or relevance, and may be the direct opposite of the truth during the crucial post-war period.

[4] H. G. Johnson in the Economic Journal, September 1954, and J. R. Hicks in *Oxford Economic Papers*, June 1953.

restrictions and, perhaps, the removal of certain threats to internal consistency—improvements which do not necessarily imply an increase in the degree of realism to which the model may lay claim. Those critics, therefore, whose objections to the Hicksian and Johnsonian models are based on charges of empirical inadequacy will not, I fear, find anything to their comfort in the following pages, and unless sufficiently imbued with the rationalist faith that the process of generalisation is itself an approach to objective truth, may well persist in their verdict that any resemblance between models of this sort and international currency problems, past or present, is largely coincidental. Nevertheless, it seems desirable that we should extend our exploration of any *given* level of abstraction, particularly when it is fast establishing itself as a secure home base to some and a worthwhile target for attack to others.

I

Let us begin by stating that the foreign-trade effects [1] which a country's productivity gain might be expected to transmit to the outside world will (on our level of abstraction) depend upon:

(1) the response of the country's money incomes (whether automatic *via* profit inflation and wage claims, or consciously elicited by monetary policies);

(2) the foreign-trade elasticities, both in the progressive country and abroad;

(3) the internal distribution of the productivity gain among the industries impinging on foreign trade (more particularly among the export and import-competing sectors);

(4) international structure,[2] *i.e.*, the progressive country's position in the world economy as determined by its relative share in the total output of internationally traded goods.

As we have seen, Mr. Johnson's type of model concentrates attention on points 1 and 2, while Professor Hicks' scheme takes in point 3 as well. Point 4 does not seem to figure in any of the formalised models at all. Yet it is clear that it must be very closely bound up with point 3; so much so, in fact, that its absence threatens to deprive that point of an essential part of its meaning: A productivity gain of a given internal incidence must surely produce quite different foreign-trade effects if, for instance, the country's share in the world output of the exported commodity were double what it was, or if its share in the total consumption of the imported commodity were only half its actual size; for in these cases the two industries would "impinge on foreign trade" in quite a different way. One would expect, therefore, that the omission of structural considerations from the two models would

[1] *I.e.*, movements in the terms of trade, export and import volumes, and the trade balance (in money terms).

[2] A vague feeling that this factor might be relevant is often expressed in loose statements such as "America is too large," or "Britain is too specialised," etc.

result in logical inconsistencies of a fairly obvious sort. This, however, is not so.

Professor Hicks is able to avoid the complications of structure by virtue of his simplifying assumption concerning income responses (point 1) coupled with his radical interpretation of the terms "export bias" and "import bias" (point 3); if there are no income responses at all, and if technical progress affects only *one* industry (either the export or the import-competing sector, but not both), the model is in many ways reduced to equivalence with the single good case, and the following prominent features of the two-commodity situation are eliminated from the start:

> (*a*) the fact that a given change in *income* will have different inflationary effects on the two commodity markets (export goods and import-competing goods) due to varying income elasticities of demand; and
>
> (*b*) the fact that a given increase in *productivity* will have different deflationary effects according to whether it occurs in export or in import-competing industries; for in the first case the supply to home consumers—being but a fraction of the industry's total output—will be *more* than proportionately affected,[1] while in the second case the home consumer will enjoy a *less* than proportionate benefit (since he is partly dependent on foreign sources whose productivity has by assumption remained constant).

By postulating constant incomes, Professor Hicks is able to avoid complication (*a*), while his working hypothesis that productivity gains are wholly concentrated on one of the two industries allows him to ignore complication (*b*). In the general case, however, when technical progress must be allowed to affect both industries simultaneously, the complications stated under (*b*) may turn out to be a vital part of the story.

Within the restricted range marked out by Professor Hicks' assumptions, his model is undoubtedly correct. It is, moreover, an eminently fertile model, not the least of its merits being that it clearly points the way to the general solution, in which (as I hope to show) the crucial concepts of "export bias" and "import bias" retain the commanding position in which Professor Hicks has installed them, although they must be re-interpreted in a way which opens the flood-gates to the long-neglected structural considerations of point 4. This, however, will be explored in the following sections. Suffice it to say here that Professor Hicks fully succeeds in banishing point 4—and for that matter point 2 (elasticities) [2]—by virtue of his restrictive assumptions concerning points 1 and 3. The forces of point 3 can therefore exercise their casting vote over the direction of the outcome.

Mr. Johnson's position regarding our four points is somewhat more difficult to assess, as he restricts each country to the production of a single

[1] For any given export volume.

[2] The only exception is the portion of the argument which refers directly to the balance of trade in money terms, where an import demand elasticity exceeding unity appears to be assumed.

commodity. Hence, national productivity gains cannot affect more than one industry, and the question of "bias" does not arise. Furthermore, the physical outputs of the two countries become incommensurable and the concept of "international structure" loses much of its meaning. If, therefore, Mr. Johnson's commodities are interpreted in the literal sense of single homogeneous goods, he does indeed avoid the embarrassments of points 3 and 4. But the model's claim to greater relevance must, I imagine, rest on the possibility of regarding each country's "commodity" as the representative of a heterogeneous bundle of goods, and this is where the difficulty arises: As soon as the sub-set of goods which is exported can cease to be a scale model of the *total* output assortment, the country's industries must vary in "export proneness" (and "import competingness"). A "uniform" productivity gain affecting each industry equally would therefore produce deflationary effects of varying strength in the different commodity markets (see *b* above), and the final outcome could not fail to be influenced by export and import ratios,[1] *i.e.*, by "international structure." Now the conclusions which Mr. Johnson draws from his model are largely dependent on the existence of a *single* inflationary pressure exerting itself with equal force on the exported and on the retained portion of a country's output. While a situation of this sort might indeed arise even in a *multiple*-industry country, it would in general presuppose a *non-uniform* (and, in view of *b*, presumably "import biased") distribution of productivity gains between the constituent industries. It may therefore be said that Mr. Johnson's model succeeds in avoiding the complications of point 4 only by transmuting them, as it were, into tacit assumptions concerning the internal incidence of productivity gains (point 3).

It will be clear from the foregoing that there is something to be gained by restoring the neglected structural factor to the general picture and constructing a model which, even at some cost in conciseness and elegance, permits all four of the basic factors to play their parts untrammelled. This will be our endeavour in the following sections.

II

Our model postulates a two-country, two-commodity world in which each country exports one of the commodities in exchange for the other, but remains a producer and consumer of both. The analysis will be conducted in terms of an international currency, with the forces of competition ensuring that an identical commodity fetches the same price in both countries, irrespective of its origin (*i.e.*, whether home-produced or imported). In contrast to most previous models of this sort we shall postulate the existence of *several* factors of production, all of them fully employed. For the rest there will be no attempt to relax the traditional simplifying assumptions, whether openly stated or implied: the portions of supply and demand which may be

[1] The proportions of total output exported and the proportions of total consumption derived from imports.

responsive to expectations and the rate of interest will be excluded from the model, being presumed to offset each other under the influence of forces which do not interfere with the rest of the mechanism.[1] International capital movements will also be left outside the purview of the model, and so will cost effects due to the import content of exports. All these factors, and many others, will be relegated to the background in order to concentrate attention on the simpler and more immediate responses of *output*, *income*, *prices*, *demand* and *supply*.

The Constants and Variables of the Model

There are two commodities, (X) and (Y). Suffixes 1 and 2 refer the symbols to countries I and II (assumed to be the only ones in existence):

Commodities.	Country I.		Country II.	
	(X)	(Y)	(X)	(Y)
Output	x_1	y_1	x_2	y_2
Export	$\underline{x}$	$\underline{\quad}$	$\underline{\quad}$	$\underline{y}$
Price	p	q	p	q
Index of physical productivity *	a_1	b_1	a_2	b_2
Index of productivity deflation *	α_1	β_1	α_2	β_2
Index of inflationary pressure *	ξ_1	η_1	ξ_2	η_2
Price elasticities (export supply and import demand)	σ_1	δ_1	δ_2	σ_2
Income elasticities (export supply and import demand*)	σ_1'	δ_1'	δ_2'	σ_2'
Disposable money income.	ω_1		ω_2	

* Explained in the following sections.

As we are chiefly interested in (proportionate) *changes* in our variables, we shall denote these in a special manner: for any variable z, conceived as a function of "time," [2] we define:

$$(0.0) \qquad \hat{z} \equiv \frac{dx}{dt} \cdot \frac{1}{x} = \frac{d \log x}{dt} = \text{"the change in } x\text{"}$$

The "capped" variables obey certain simple rules which will greatly facilitate our calculations:

$$(0.1) \quad \begin{array}{lll} \text{If } z = k \cdot uv, & \text{then } \hat{z} = \hat{u} + \hat{v} & (k \text{ constant}) \\ \text{If } z = k \cdot u/v, & \text{then } \hat{z} = \hat{u} - \hat{v} & (\text{,, ,,}) \\ \text{If } z = f(u, v), & \text{then } \hat{z} = \dfrac{Ez}{Eu}\hat{u} + \dfrac{Ez}{Ev}\hat{v}, & \end{array}$$

where the coefficients are the elasticities of z with respect to u and v.

[1] This leaves us free to follow the usual practice of treating internationally traded commodities as if they were to all intents and purposes consumption goods.

[2] In reality "time" is, of course, a dummy variable of which nothing is more required than that it should vary independently of all the other variables of the system. The convenient designation "time" does not elevate our essentially static system to the dignity of a dynamic one.

Elasticities

The income elasticities of export supply are here understood as measures of the proportion of output diverted from home consumption to exports (in response to a fall in income) *on the assumption of unchanged total output at home.* Similarly, the income elasticities of import demand are taken to measure the effect on imports of a rise in income *on the assumption of unchanged home production* in the import-competing line.

In the course of the analysis we shall often be interested in a country's income elasticities in relation to the *total* elasticity of the international market (for the commodities concerned), and it will be useful to define " relative income elasticities " as:

$$(0.2)\qquad \sigma_{10}' \equiv \frac{\sigma_1'}{\sigma_1' + \delta_2'} \qquad \delta_{10}' \equiv \frac{\delta_1'}{\delta_1' + \sigma_2'}$$
$$\sigma_{20}' \equiv \frac{\sigma_2'}{\sigma_2' + \delta_1'} \qquad \delta_{20}' \equiv \frac{\delta_2'}{\delta_2' + \sigma_1'}$$

Since the strength or weakness of a country's influence on international trade depends not merely on how radically it makes its income changes felt abroad, but on how much *more* (or less) radically it does so than the rest of the world, it is clear that the relative income elasticities can be regarded as indicators of some significance in their own right.[1]

As will appear shortly, the complications of a two-country, two-commodity model are such that our results will often depend on certain odd-looking combinations of price and income elasticities which constantly recur in the final formulæ. These need not cause undue alarm, since all their relevance to the argument is contained in the simple fact that they are *elasticity* constants, and normally positive.[2]

The Meaning of " Productivity "

The chief problem of a model which allows more than one commodity to be produced in any country is the disentanglement of productivity *as an independent force* from those of its variations which are due to changes in scales

[1] A number of simple relations involving income elasticities are given below for future reference. While of no particular relevance in themselves, they will be found to simplify the algebra of the subsequent argument quite considerably. From definitions (0.2) it follows at once that: $\sigma_1'\delta_{20}' = \sigma_{10}'\delta_2'$, $\sigma_2'\delta_{10}' = \sigma_{20}'\delta_1'$ and $\sigma_{10}' + \delta_{20}' = \sigma_{20}' + \delta_{10}' = 1$. We can therefore distinguish two " invariants " of the income elasticities which will play an important part in our calculations:

$$\pi \equiv \sigma_1'\delta_{20}' + \delta_1'\sigma_{20}' = \sigma_2'\delta_{10}' + \delta_2'\sigma_{10}'$$
$$\Delta \equiv \delta_{10}' - \sigma_{10}' = \delta_{20}' - \sigma_{20}'$$

We shall not attempt to place an economic interpretation on these constants. The name " invariants " is suggested by the fact that they would retain their value if the roles of countries I and II were reversed.

[2] We define the following mixed elasticity constants:

$$R \equiv \frac{\sigma_1 + \delta_2}{\sigma_1' + \delta_2'} + \frac{\sigma_2 + \delta_1}{\sigma_2' + \delta_1'} - 1$$
$$S \equiv 1 + \sigma_1 + \sigma_2 - (\sigma_1 + \delta_2)\sigma_{10}' - (\sigma_2 + \delta_1)\sigma_{20}'$$
$$Q \equiv R\pi + S\Delta \text{ (see footnote } sup.\text{)}$$

of production, particularly when the latter are induced by shifts in factor employment which are themselves responses to productivity changes.[1] The following definition of productivity is suggested to meet this difficulty:

Let x_1 and y_1 be the output of the two commodities in country I (with a total endowment of two factors measured by u_1 and v_1),[2] and let the production functions be of the form:

$$(0.3) \qquad \begin{aligned} x_1 &= a_1 F_1(u_1', v_1') \\ y_1 &= b_1 G_1(u_1'', v_1'') \end{aligned}$$

where the primed variables denote the factor inputs of the two industries respectively. No definite assumption concerning the shape of these functions need be made,[3] increasing and decreasing returns to scale being equally admissible.

We shall now define rises in productivity as (proportionate) *increases in the coefficients* a_1 *and* b_1 ($\hat{a}_1$ and $\hat{b}_1$). It should be noted that we do not pretend to know how given *levels* of productivity should be measured. All that we postulate is that technological change takes the form of increasing a given output by the same percentage *for any combination of factor inputs in the relevant range*, and that this percentage may be taken as a measure of the rise in productivity in the industry concerned.

Since the factor supply to an industry will, *cet. par.*, depend on the monetary reward which it can offer per unit factor relatively to the rewards obtainable elsewhere, our formulæ (0.3) may be re-written [4]

$$(0.4) \qquad \begin{aligned} x_1 &= a_1 L_1\left(\frac{a_1 p}{b_1 q}\right) = a_1 L_1(e_{11} t_1) \\ y_1 &= b_1 M_1\left(\frac{b_1 q}{a_1 p}\right) = b_1 M_1\left(\frac{1}{e_{11} t_1}\right) \end{aligned}$$

where e_{11} stands for the "export bias" of the country's productivity ($= a_1/b_1$) and t_1 for the price ratio p/q (which in our model also represents country I's terms of trade). The expression e_{11} assumes a definite meaning only when productivities *change*, in which case $\hat{e}_{11}$ ($= \hat{a}_1 - \hat{b}_1$) is the export bias of country I's productivity gain, and $\hat{e}_{22}$ ($= \hat{b}_2 - \hat{a}_2$) that of country II.

[1] Mr. H. G. Johnson remarks (*op. cit.*, p. 64) that "the assumption that a number of goods are produced, unless hedged about by enough assumptions to reduce it to equivalence with the single-good case, either introduces problems of re-allocation at varying real cost, which make the change in productivity in part a dependent variable, or, on the assumption of constant relative cost of all products, introduces awkward problems of discontinuity in international adjustment."

[2] The number of factors is immaterial to this argument; so is the postulate of fixed total endowments: u_1 and v_1 may vary autonomously with "time" as long as they remain fully employed.

[3] But see footnote 4 below.

[4] The transition from (0.3) to (0.4) can be effected as follows: if p and q are the two commodity prices, the equilibrium condition of equal marginal products for each factor in the two industries requires that $\frac{pa_1}{qb_1}\frac{\partial F_1}{\partial u_1'} = \frac{\partial G_1}{\partial u_1''}$ and $\frac{\partial F_1}{\partial v_1'} = \frac{qb_1}{pa_1}\frac{\partial G_1}{\partial v_1''}$. For any given total factor endowment (u_1, v_1) the factor inputs into (Y) may be expressed as $u_1 - u_1'$ and $v_1 - v_1'$, and the two equations solved for u_1' and v_1' (certain types of production functions, notably linear forms, which would make the equations trivial or insoluble, may be excluded without loss of generality). The substitution of these solutions in (0.3) yields (0.4).

To find the direct nexus between productivity gains and output gains (in the absence of price changes) we need only apply our rules (0.1) to the above equations while holding prices constant ($\hat{t}_1 = 0$). In this way we obtain:

$$\hat{x}_1' = \hat{a}_1 + \lambda_1 \hat{e}_{11} \tag{0.5}$$
$$\hat{y}_1' = \hat{b}_1 - \mu_1 \hat{e}_{11}$$

where λ_1 and μ_1 are the factor supply elasticities. These definitions of what we shall call the *productivity-induced output gains* summarise the two non-price effects of a productivity gain of given internal incidence:

(1) The immediate output growth resulting at the given level of factor employment in the industry.

(2) The secondary output change due to a factor *shift* induced by the bias of the productivity gain in favour of the industry under consideration.

The priming of the letters in (0.5) indicates that we exclude the effect of any further factor shifts which may be caused by the resulting change in relative *prices*.[1]

Productivity Deflation and Income Inflation

In international dealings each of the productivity-induced output gains will generate its own deflationary pressure, which we propose to measure by what (for want of a better term) we shall call its "income absorption." This is defined for any given output gain x_1' (and therefore for the productivity gain by which it is induced) as the *percentage rise in the country's total money income which would be just sufficient to absorb the incremental supply at home without a change in its price.* An income rise of this magnitude would exactly revoke or "sterilise" the direct effect which the productivity gain would otherwise have had on the foreign-trade flow concerned: In the case of an export good, it would restore its supply to foreign markets, and in the case of an import-substitute the demand for its importation from abroad (both at the old price).

To find the algebraic nexus between a productivity gain and its "income absorptions" as defined above, we proceed as follows:

(1) The incremental output of industry X induced by the productivity gain will be $x_1\hat{x}_1'$.

(2) The effect of a hypothetical income rise $\hat{\omega}_1$ on the country's export supply (x) would be a reduction by $100\sigma_1'\hat{\omega}_1\%$ through increased home consumption, *i.e.*, an absolute decrement of $x\sigma_1'\hat{\omega}_1$.

(3) If the income rise is to revoke exactly the productivity gain in the

[1] As will appear shortly, not much depends on the algebraic link between productivity and output gains as here established. Indeed, the following analysis would retain much of its validity if it dispensed with a definition of productivity altogether, and took for its starting point the assumption of autonomous changes in *output* ($\hat{x}_1', \hat{y}_1'$) rather than in productivity. But no harm is done—and some conceptual definiteness achieved—by thinking of these as sparked by physical productivity gains in the sense defined above.

field of exports, it must satisfy the equation $x_1\hat{x}_1' = x\sigma_1'\hat{\omega}_1$. Hence the "income absorption" of the gain as far as commodity (X) is concerned will be

$$\hat{\alpha}_1 = \frac{x_1}{x\sigma_1'}\hat{x}_1'. \tag{0.6}$$

The argument in the case of the import-competing industry is exactly analogous: An output increment $y_1\hat{y}_1'$ must be absorbed by an income-induced demand increment $y\delta_1'\hat{\omega}_1$. The necessary income rise must therefore be:

$$\hat{\beta}_1 = \frac{y_1}{y\delta_1'}\hat{y}_1'. \tag{0.7}$$

Similar equations will, of course, obtain for country II:

$$\hat{\alpha}_2 = \frac{x_2}{x\delta_2'}\hat{x}_2' \qquad \text{and} \qquad \hat{\beta}_2 = \frac{y_1}{y\sigma_2'}\hat{y}_2'. \tag{0.8}$$

These magnitudes may be regarded as the "productivity deflations" operative in international trade, or alternatively as the productivity gains *themselves* as measured in the economically relevant terms of "income absorption."

The latter expression may be more readily understood if we visualise the simultaneous occurrence of an income rise and a productivity gain, with the latter "absorbing" a portion of the former's effects and leaving only a residual to exert inflationary pressure on the commodity markets concerned. We might interpret this pressure as the income rise which would have been necessary to produce the same price effects *in the absence of a productivity gain*. Let us therefore define the net "inflationary pressures" exerted by each of the two countries in the two markets as:

$$\hat{\xi}_r \equiv \hat{\omega}_r - \hat{\alpha}_r \qquad \text{and} \qquad \hat{\eta}_r \equiv \hat{\omega}_r - \hat{\beta}_r. \qquad (r = 1, 2) \tag{0.9}$$

In order to give a concrete meaning to the symbols α_r and β_r (as opposed to their proportionate changes $\hat{\alpha}_r$ and $\hat{\beta}_r$) we shall arbitrarily define them as equal to the money income *as long as no productivity changes take place*, but as varying in response to such changes in the manner of equations (0.6) to (0.8), regardless of the subsequent behaviour of *actual* money incomes. This will make the indices of inflationary pressure $\xi_r\left(\equiv \frac{\omega_r}{\alpha_r}\right)$ and $\eta_r\left(\equiv \frac{\omega_r}{\beta_r}\right)$ equal to unity in the absence of all change, and allow them to increase only when incomes rise *faster* than would be necessary to absorb attendant productivity gains. In any situation involving productivity changes, therefore, these variables would seem to be the proper replacements for the normal income terms in demand and supply functions.

III

Armed with the conceptual tools assembled in the previous sections we shall now proceed to the actual mechanism of the model.

International Flow Equations and the Terms of Trade

Each of the two foreign-trade flows (x and y) can be simultaneously regarded as an export supply and an import demand, according to the country whose point of view we choose to adopt. In either of these capacities we shall assume the trade flows to be dependent on two variables:

(*a*) The price of the commodity *relative to that of the other good*; in our two-commodity model this is, of course, identical with the terms of trade ($t_1 = p/q$).

(*b*) A composite income term, designed to measure only such *residual inflationary pressure* on the market concerned as remains after allowing for the deflating effect of productivity gains. Since we are looking at *real* rather than monetary relationships (our price-term is a *ratio* and not an absolute price), this inflationary pressure must be measured in terms of its commodity equivalent rather than in money, the *numéraire* always being the commodity *not involved* in the dependent variable of the function.

The international flow equations may therefore be written as follows:

$$(1.0) \qquad \begin{aligned} x &= S_1\left(t_1, \frac{\xi_1}{q}\right) = D_2\left(t_1, \frac{\xi_2}{q}\right) \\ y &= S_2\left(\frac{1}{t_1}, \frac{\eta_2}{p}\right) = D_1\left(\frac{1}{t_1}, \frac{\eta_1}{p}\right). \end{aligned}$$

We shall now set the system in motion by assuming autonomous changes in the *four productivity levels* ($\hat{a}_1$, $\hat{a}_2$, $\hat{b}_1$, $\hat{b}_2$) and the *two money incomes* ($\hat{\omega}_1$ and $\hat{\omega}_2$). There will be no necessary connection between the former and the latter; for whatever induced income changes may be brought about by the productivity gains (through higher profits and wage demands, etc.) might well be counteracted or reinforced by a monetary policy aimed at full employment, or by a train of saving-investment reactions whose outcome is sufficiently remote from the initial impulse to qualify as an independent force.[1] The postulated changes will produce inflationary pressures ($\hat{\xi}_1$, $\hat{\eta}_1$; $\hat{\xi}_2$, $\hat{\eta}_2$) and affect the foreign-trade flows (1.0) in the following way:[2]

$$(1.1) \qquad \begin{aligned} \hat{x} &= \sigma_1\hat{t}_1 - \sigma_1'(\hat{\xi}_1 - \hat{q}) = -\delta_2\hat{t}_1 + \delta_2'(\hat{\xi}_2 - \hat{q}) \\ \hat{y} &= -\sigma_2\hat{t}_1 - \sigma_2'(\hat{\eta}_2 - \hat{p}) = \delta_1\hat{t}_1 + \delta_1'(\hat{\eta}_1 - \hat{p}). \end{aligned}$$

As usual, we have chosen the signs of the price and income elasticities in such a way that the relevant symbols will in all normal cases represent positive values.[3]

[1] The income relevant to demand functions (ω_r) is in fact best regarded as the *spendable* income of consumers. It will vary under the influence of wage demands, farm support prices, budgetary tax and welfare provisions, etc., and need not equal the sum of factor incomes in any given period (*i.e.*, $\omega_r \neq px_r + qy_r$). In this respect we part company with Mr. Johnson, who expressly postulates $\omega_1 = px_1$ and $\omega_2 = qy_2$ (for single-industry countries), relationships which incidentally serve him as a substitute for export-supply functions. [2] See equations (0.1).

[3] Negativity is not, of course, excluded, but carries the usual connotation of "inferiority" or upward-sloping demand curves.

The equations may now be solved to determine the price changes consistent with equilibrium. Having regard to (0.9) and (0.2), we can write:

$$\begin{aligned}\hat{p} &= \frac{\sigma_2 + \delta_1}{\sigma_2' + \delta_1'}\hat{t}_1 + \sigma_{20}'\hat{\omega}_2 + \delta_{10}'\hat{\omega}_1 - \hat{\beta} \\ \hat{q} &= -\frac{\sigma_1 + \delta_2}{\sigma_1' + \delta_2'}\hat{t}_1 + \sigma_{10}'\hat{\omega}_1 + \delta_{20}'\hat{\omega}_2 - \hat{\alpha}\end{aligned} \tag{1.2}$$

where the extreme R.H.S. arises from an additional (and fairly obvious) definition of " world productivity deflations " as weighed averages of their national components, *i.e.*:

$$\begin{aligned}\hat{\alpha} &\equiv \sigma_{10}'\hat{\alpha}_1 + \delta_{20}'\hat{\alpha}_2 \\ \hat{\beta} &\equiv \delta_{10}'\hat{\beta}_1 + \sigma_{20}'\hat{\beta}_2.\end{aligned} \tag{1.3}$$

The effects on the terms of trade may now be determined by simply subtracting equations (1.2) from one another and solving for $\hat{t}_1$. Using the notation of footnotes 1 and 2 on p. 681, this yields:

$$\hat{t}_1 = -\frac{\Delta}{R}\hat{\phi}_1 - \frac{\hat{\alpha} - \hat{\beta}}{R} \tag{1.4}$$

where $\hat{\phi}_1$ stands for the movement of relative money incomes, sometimes referred to as the " factorial terms of trade ":

$$\phi_1 \equiv \frac{\omega_1}{\omega_2} \text{ (hence } \hat{\phi}_1 = \hat{\omega}_1 - \hat{\omega}_2\text{).} \tag{1.5}$$

If we can regard R as positive, which would seem to be a reasonable assumption,[1] equation (1.4) gives a more precise interpretation to the obvious fact that in the absence of income changes a country's commodity terms of trade will *improve* ($\hat{t}_1 > 0$) if the deflationary pressure of international productivity gains falls more heavily on its *imports* than on its exports ($\hat{\beta} > \hat{\alpha}$), and deteriorate in the converse case. With changes in incomes, the commodity terms of trade will tend to move in the direction of the factorial terms of trade if Δ is negative, and in the opposite direction if Δ is positive. Again, this is no more than might have been expected; for if the *supply* reactions to income changes are stronger than the *demand* reactions (*i.e.*, $\Delta < 0$),[2] a country whose money income increases relatively to that of the outside world will curtail its export supply more radically than it expands its import demand, thus generating a pressure on relative prices favourable to itself.[3]

The chief merit of equation (1.4) for our purpose is the separation of the income effect from the productivity effect, the first of which ($\hat{\phi}_1$) may in certain circumstances qualify as a " parameter of action," since (within certain limits) it is open to manipulation by conscious monetary or

[1] With two commodities only, which are bound to be mutual substitutes, price elasticities may be expected to be larger than the corresponding income elasticities; see footnote 2 on p. 681.

[2] Or $\sigma_{ro} > \delta_{ro}$ for both countries; see footnote 1 on p. 681.

[3] This pressure cannot be revoked by the price elasticities as long as these are larger than the income elasticities ($R > 0$).

fiscal policy,[1] while the second will be determined by the direction which technological progress happens to take in any particular period.

The Balance of Trade

A country's trade balance will here be measured by the ratio of its export to its import value: [2]

$$\tau_1 \equiv \frac{px}{qy} = \frac{x}{y} t_1 \text{ (hence } \tau_1 = \hat{x} - \hat{y} + \hat{t}_1). \tag{1.6}$$

To explore the behaviour of this crucial ratio in response to income and productivity changes we need only subtract the second from the first equation in (1.1) and add the expression for $\hat{t}_1$ from (1.4). Using the notation of footnotes 1 and 2 on p. 681, this yields:

$$\hat{\tau}_1 = -\frac{Q}{R}\hat{\phi}_1 - \frac{S}{R}(\hat{\alpha} - \hat{\beta}) + \pi\hat{\Lambda}_1 \tag{1.7}$$

where $\hat{\Lambda}_1$ stands for a weighted average of the "productivity leads" of country I over country II in the two existing lines of production (measured in terms of deflation equivalents):

$$\hat{\Lambda}_1 \equiv \frac{\sigma_1'\delta_{20}'(\hat{\alpha}_1 - \hat{\alpha}_2) + \delta_1'\sigma_{20}'(\hat{\beta}_1 - \hat{\beta}_2)}{\sigma_1'\delta_{20}' + \delta_1'\sigma_{20}'}. \tag{1.8}$$

Equation (1.7) makes explicit a number of determinants of the trade balance whose separate effects have often been noted in the past without, however, being brought together in a single formula. Since the constants π, R, S and Q may normally be taken to be positive,[3] the equation states that a country's trade balance will tend to *improve* ($\hat{\tau}_1 > 0$), if:

(1) its money income falls relatively to that of the outside world, *i.e.*, $\hat{\phi}_1 < 0$;

(2) international progress has a "deflation bias" towards the imported commodity, *i.e.*, $\hat{\beta} > \hat{\alpha}$;

(3) the country's "average" productivity deflation is greater than that of the outside world, *i.e.*, $\hat{\Lambda}_1 > 0$.

Monetary Policy and the Terms of Trade

In the previous sections we have tried to show how the terms of trade (1.4) and the trade balance (1.7) will react to productivity changes, given that the countries' money incomes are free to vary in response to internal stimuli (suitably corrected to safeguard full employment) without being manipulated by monetary or fiscal measures to counteract untoward developments in the sphere of foreign trade itself. This is of considerable interest, but we

[1] *E.g.*, general income deflation or devaluation in country I may achieve $\hat{\phi}_1 < 0$.

[2] Although usually conceived of as the *difference* of these values ($px - qy$), the present definition of the trade balance as their *ratio* has obvious algebraic advantages when interest centres on proportional changes. The same definition is used in Mr. Johnson's article (*op. cit.*) to excellent purpose.

[3] In the case of π this merely excludes "inferiority" and upward-sloping demand curves; in the case of the other constants it excludes what are generally acknowledged to be "perverse" cases, such as a deterioration in the trade balance after devaluation ($Q < 0$), etc.

may wish to follow Professor Hicks and examine the behaviour of the terms of trade when income movements are so manipulated as to maintain (or restore) a threatened balance of trade. The *rationale* of such an analysis rests on the belief that it is precisely when monetary policies imperative in the interest of national solvency result in continual real losses through adverse movements in the terms of trade, that we can speak of currency shortages that are at once chronic and acute.[1]

Let us, then, assume that country I, faced with the threat of a negative trade balance through "adverse" world productivity trends (*i.e.*, $\hat{\alpha} > \hat{\beta}$ and/or $\hat{\Lambda}_1 < 0$), decides to reduce its money income relatively to the rest of the world ($\hat{\phi}_1 < 0$) by exactly as much as is necessary to counter the threat and keep the trade balance stable. How will this affect the terms of trade? Algebraically the answer is easily found. We need only put (1.7) equal to zero, solve for $\hat{\phi}_1$ and substitute in (1.4). The result may be written[2]:

$$(1.9) \qquad \hat{t}_1' = -\frac{\pi}{Q}\left[\frac{\frac{\sigma_1'\delta_1'}{\sigma_1'+\delta_1'}\hat{\epsilon}_{11} + \frac{\sigma_2'\delta_2'}{\sigma_2'+\delta_2'}\hat{\epsilon}_{12}}{\frac{\sigma_1'\delta_1'}{\sigma_1'+\delta_1'} + \frac{\sigma_2'\delta_2'}{\sigma_2'+\delta_2'}}\right] = -\frac{\pi}{Q}\hat{\epsilon}_1$$

where $\hat{\epsilon}_{11}$ and $\hat{\epsilon}_{12}$ are defined as the *degrees of* (*deflation*) *bias* in favour of country I's exports (X) exerted by the productivity gains of countries I and II respectively, *i.e.*:

$$(1.10) \qquad \hat{\epsilon}_{11} \equiv \hat{\alpha}_1 - \hat{\beta}_1$$
$$\hat{\epsilon}_{12} \equiv \hat{\alpha}_2 - \hat{\beta}_2$$

The expression $\hat{\epsilon}_1$, analysed in the square brackets of (1.9), is a simple weighted average of the two countries' (deflation) biases in favour of commodity X,[3] and may therefore be interpreted as the "international bias" in favour of country I's exports.

It is equation (1.9) which relates what appear to be the most decisive variables of the problem *in the long run*, *i.e.*, when neither country can afford to lose reserves indefinitely ($\hat{\tau}_1 = 0$). Above all, it defines the sense in which Professor Hicks' indictment of import-biased productivity trends retains its general validity: since both π and Q are assumed to be positive, we find that an international bias in favour of country I's exports ($\hat{\epsilon}_1 > 0$, which is, of course, an *import* bias from country II's point of view) will in the long run turn the terms of trade against country I, notwithstanding that country's possible leadership in technological progress, and regardless of the movements in relative money incomes. It must be emphasised, however, that "export bias" and "import bias" are here defined in terms of *income absorption* (*i.e.*, deflation effects) and not in *physical* terms.

In the particular case where country II is completely stationary (*i.e.*,

[1] It may well be that this fact, and hence the following analysis, is more relevant to the case of *Britain* (rather than America) *contra mundum*, since the terms of trade will seriously affect real income only where foreign trade bulks largely in the economy.

[2] The primed symbol $\hat{t}_1'$ denotes the change in the terms of trade *subject to the condition* $\hat{t}_1 = 0$.

[3] The weights are the harmonic means of the relevant income elasticities.

$\hat{\epsilon}_{12} = 0$), the " world bias " $\hat{\epsilon}_1$ will be proportional to $\hat{\alpha}_1 - \hat{\beta}_1$. It is clear, therefore, that if in addition all progress in country I were concentrated on the export industry, *i.e.*, $\hat{\beta}_1 < 0$ [1] and therefore $\hat{\epsilon}_1 > 0$, the terms of trade must turn in favour of country II ($\hat{t}_1 < 0$), while " extreme " import bias ($\hat{\alpha}_1 < 0$ [2] and $\hat{\epsilon}_1 < 0$) would have the opposite effect. Since, moreover, in these particular cases the sign of the *deflation* bias $\hat{\epsilon}_1$ cannot fail to accord with that of the *physical* bias, Professor Hicks' contentions are completely borne out under the restrictive assumptions specified. But as soon as the postulate of a one-country, one-industry productivity gain is abandoned, the re-interpretation of his theorem in terms of *deflationary* productivity bias (as defined in (1.9)) assumes a crucial importance; for the latter may differ in direction as well as in extent from the *physical* bias by which it is caused. It is precisely the transmutation of physical productivity gains into deflationary bias which opens the door to the long-neglected factor of *international structure* and, as we shall see in the following section, assures it a place of central importance in our model.

IV

In the previous section we concluded that the maintenance of international solvency ($\hat{\tau}_1 = 0$) will cause a country to suffer from steadily worsening terms of trade ($\hat{t}_1' < 0$) if, given the prevailing demand and supply elasticities, the incidence of economic progress in the world is such as to exert a greater deflationary pressure on its exports than on its imports ($\hat{\epsilon}_1 > 0$). In order to identify the simplest patterns of output and technology productive of such export-biased deflation effects we must re-translate the " income absorptions " which have so far served us as measures of productivity gains ($\hat{\alpha}_r$, $\hat{\beta}_r$) into the *physical* rates of improvement ($\hat{a}_r$, $\hat{b}_r$) from which they were originally derived.

From (1.9) and (1.10) it is evident that an export bias in terms of productivity deflation ($\hat{\epsilon}_1 > 0$) must imply that

$$(2.0) \qquad \frac{\sigma_1'\delta_1'}{\sigma_1' + \delta_1'}(\hat{\alpha}_1 - \hat{\beta}_1) + \frac{\sigma_2'\delta_2'}{\sigma_2' + \delta_2'}(\hat{\alpha}_2 - \hat{\beta}_2) > 0.$$

By expressing $\hat{\alpha}_r$ and $\hat{\beta}_r$ in terms of the " productivity-induced " output gains (see (0.6) to (0.8)), this condition may be put as:

$$(2.1) \qquad \frac{\delta_1' y_{10}}{\sigma_1' + \delta_1'}\left(\frac{x_{10}}{y_{10}} - \frac{\hat{y}_1'}{\hat{x}_1'}\frac{\sigma_1'}{\delta_1'}\right)\hat{x}_1' > \frac{\delta_2' x_{20}}{\sigma_2' + \delta_2'}\left(\frac{y_{20}}{x_{20}} - \frac{\hat{x}_2'}{\hat{y}_2'}\frac{\sigma_2'}{\delta_2'}\right)\hat{y}_2'$$

where x_{ro} and y_{ro} stand for the ratios of national outputs to foreign trade flows, *i.e.*,

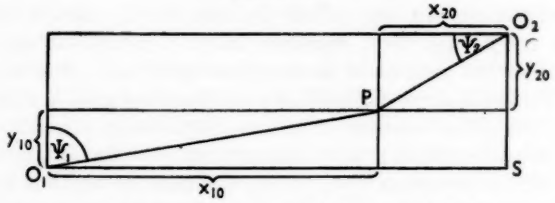
$$(2.2) \qquad x_{ro} = \frac{x_r}{x} \qquad \text{and} \qquad y_{ro} = \frac{y_r}{y}.$$

The cross-ratios $\frac{x_{10}}{y_{10}}$ and $\frac{y_{20}}{x_{20}}$ in (2.1) may be interpreted as the " degrees of specialisation " of the two countries in the international division of labour; for " specialisation " can be said to increase whenever a country's importance

[1] Since $\hat{y}_1' = -\mu_1\hat{a}_1$; see (0.5). [2] Since $\hat{x}_1' = -\lambda_1\hat{b}_1$; see (0.5).

as a producer of the exported commodity (x_{10} and y_{20}) grows at the expense of its relative weight as a producer of the imported commodity (y_{10} and x_{20}). The position can be represented on the traditional two-country, two-commodity diagram.

DIAGRAM 1



The sides of the rectangle measure the world output of the two commodities ($x_{10} + x_{20}$ and $y_{10} + y_{20}$), the physical units of measurement being chosen so as to make both export volumes (x and y) equal to unity.[1] Point P represents the international structure of world production, with the contributions of country I measured from O_1, and those of country II (in the opposite directions from O_2). The two "degrees of specialisation" are therefore measured by the tangents of angles ψ_1 and ψ_2 respectively. The larger these angles, the greater the extent of international specialisation, until in the extreme case point P becomes coincident with S, the point of "complete specialisation."

The Case of "Uniform" Productivity Trends

Let us now assume that each country's productivity gain is *uniformly* distributed over the two industries, *i.e.*, $\hat{a}_r = \hat{b}_r \equiv \hat{z}_r$. In that case all physical export bias ($\hat{e}_{rr}$) will vanish and, in conformity with (0.5), the "productivity-induced output gains" will both be equated to the country's overall rate of advance, *i.e.*, $\hat{x}_r' = \hat{y}_r' = \hat{z}_r$.[2]

Condition (2.1) therefore reduces to:

(2.3) $\quad \hat{\epsilon}_1 > 0$ (hence $\hat{t}_1' < 0$),[3] if $A_1\hat{z}_1 > A_2\hat{z}_2$

where $$A_1 \equiv \frac{\delta_1' y_{10}}{\sigma_1' + \delta_1'}\left(\frac{x_{10}}{y_{10}} - \frac{\sigma_1'}{\delta_1'}\right)$$

and $$A_2 \equiv \frac{\delta_2' x_{20}}{\sigma_2' + \delta_1'}\left(\frac{y_{20}}{x_{20}} - \frac{\sigma_2'}{\delta_2'}\right)$$

A glance at the definitions of the constants A_1 and A_2 will convince us that, given positive income elasticities, their signs (and hence the validity of

[1] If we start from a position of balanced trade ($px = qy$) this means measurement proportional to current value, since $x = y = 1$ implies the equality of the two prices p and q.

[2] It should be noted that our particular definition of productivity, though probably the most amenable to this sort of analysis, is by no means the only one to give the subsequent argument relevance or validity. *Any* definition which allows us to speak of "uniform" productivity gains whenever the two industries show equal productivity-induced output increases may be substituted without prejudice to the conclusions of this section.

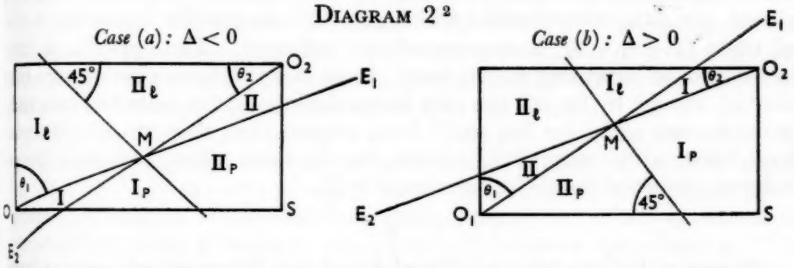
[3] The symbol $\hat{t}_1'$, it will be remembered, stands for the change in the terms of trade *given that the trade balance is kept stable.*

(2.3)) will depend entirely on the position of the production point P relative to the elasticity-ratios $\frac{\sigma_1'}{\delta_1'}$ and $\frac{\sigma_2'}{\delta_2'}$. In fact, when the latter are represented (as in Diagram 2) by two straight lines (E_1 and E_2) issuing from the origins and intersecting at M,[1] we can mark out a number of zones for P, for which various propositions regarding conditions (2.3), and hence the long-run term-of-trade effects may be quite generally asserted. It is clear from inspection that condition (2.3), inflicting adverse terms of trade movements on country I, must obtain:

(1) For *any* $\hat{z}_1$ and $\hat{z}_2$, if $A_1 > 0$ *and* $A_2 < 0$. Zone *I*.
(2) For all $\hat{z}_1 > \hat{z}_2$ if $A_1 > A_2 > 0$ . . . . Zone I_p.
(3) For all $\hat{z}_1 < \hat{z}_2$ if $0 > A_1 > A_2$ . . . . Zone I_l.

Similar assertions *mutatis mutandis* may, of course, be made concerning country II, thereby defining the analogous Zones *II*, II_p, II_l.

DIAGRAM 2 [2]



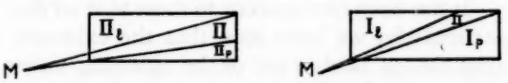
It appears, then, that the "international structure" of production, *i.e.*, the zonal position of the production point on the diagrams, plays quite as important a role in allocating the real gains and losses in foreign trade as do the elasticities of demand and supply, *i.e.*, the position of the zonal boundaries.[3]

The General Case of Biased Productivity Trends

Everything that may be deduced from Diagram 2 concerning the case of "uniform" trends remains valid in the general case, provided only that the

[1] Where $\tan \theta_1 = \frac{\sigma_1'}{\delta_1'}$ and $\tan \theta_2 = \frac{\sigma_2'}{\delta_2'}$.

[2] Should the elasticity-lines E_1 and E_2 intersect *outside* the rectangle, the number of effective zones will be reduced to three, *e.g.*:



[3] Perhaps the simplest way of "reading" the diagrams is to say: With the production point in zone $I_l/I_p/I$, the maintenance of balanced trade will result in terms of trade movements against country I if it is *relatively laggard/relatively progressive/in any case*; and *mutatis mutandis* for country II. In other situations, *e.g.*, where the production point is in I_l and country I is *not* laggard, the terms of trade will still turn against it, unless the margin of its lead over country II exceeds a certain minimum (see (2.3)).

diagram is re-interpreted in the light of condition (2.1) rather than of its simplified version (2.3):

(1) The angles θ_1 and θ_2 will no longer depend exclusively on the countries' elasticity-ratios, but must be taken to *increase* to the extent that physical *import* bias is present $\left(i.e., \tan\theta_1 = \frac{\hat{y}_1'}{\hat{x}_1'}\frac{\sigma_1'}{\delta_1'} \text{ and } \tan\theta_2 = \frac{\hat{x}_2'}{\hat{y}_2'}\frac{\sigma_2'}{\delta_2'}\right)$.

(2) The "lead" or "lag" of a country must now be taken as determined by the behaviour of export industries only, *i.e.*, country I is "leading" (or "lagging") if its *export* industry develops faster (or slower) than the *export* industry of country II (*i.e.*, I_p causes $\hat{t}_1' < 0$ if $\hat{x}_1' > \hat{y}_2'$, and I_t in the converse case).

When re-interpreted in this way, the delineation and significance of the zones in Diagram 2 remains unaffected by the relaxation of the "uniformity" postulate.

We may mention one particular conclusion which can easily be read off the Diagram: As country II's import bias increases (*i.e.*, the angle θ_2 grows), the danger area within which country I may suffer worsening terms of trade ($I + I_t + I_p$) is correspondingly enlarged. The opposite is true in the case of increasing export bias. From this it follows that import bias abroad, though by far not the only factor decisive of the outcome, can only make matters worse (or less good) for a country than they would otherwise have been, while export bias abroad, by the same token, can only be an influence for good (or the mitigation of evil).

V

In section I of this article we listed four major factors which, on our level of abstraction, may be held to determine the foreign-trade effects of international productivity gains: Income responses, foreign-trade elasticities, the bias of productivity gains, and "international structure." The first of these has independent status only when we are concerned with the *direct* and *automatic* effect of world progress on a country's trade balance (Mr. Johnson's problem). If, however, we allow for the conscious pursuit of national solvency through corrective income manipulation (deflation or devaluation), and our interest centres on the incidence of the "real cost" of that solvency in barter terms (Professor Hicks' problem), the first of our factors loses independent status, and the burden of deciding the outcome is thrown upon the remaining three: the foreign-trade elasticities, the bias of productivity gains, and "international structure."

It has been our concern to show that *all three* of these are relevant. More particularly, we have seen that the existence of export or import bias by itself cannot be decisive of the outcome, unless the terms are understood to refer to the *deflation effects* of these gains (as defined in (1.9)), rather than to the gains themselves. In the normal *physical* interpretation of the term such a bias may turn the country's terms of trade in either direction, depending on the pre-existing structure of world production, without which the whole problem would appear to be incompletely specified.

The particular manner in which our three factors combine to decide the outcome is too complicated to be stated in a few simple propositions; it is probably most concisely stated in diagrammatic form (see Diagram 2): The ratio of each country's foreign-trade elasticities multiplied by the import bias of its productivity gain determines the position of the zonal boundaries which divide the rectangle (*i.e.*, angles θ_1 and θ_2), while the forces of " international structure " determine the position of the production point within the diagram. Clearly, a knowledge of all these factors is required before the " victim " of international progress-cum-solvency can be identified (see footnote 3 on p. 691).[1]

For the sake of concreteness we shall single out two obvious ways in which the forces of international structure may come into play:

(1) *Relative Size.* If country I's " size " is measured by the distance of the production point O_1 (Diagram 2, case *a*), it is clear that the larger it bulks in world production, the greater will be the chance of the production point lying in zones II_l, II_p or *II*, *i.e.*, the greater the danger of adverse terms-of-trade movements for country II, whether it be progressive or laggard.[2] In a sense, therefore, the frequent statement that the mere predominance of a country may create adjustment difficulties where these might otherwise not have existed, cannot be ruled out of court.

(2) *International Division of Labour.* In any situation in which the barter trends are against a laggard country (*i.e.*, production point in zones *I* or II_l), the balance of advantage might conceivably be redressed by an increased degree of international specialisation, *i.e.*, a movement of the production point towards *S*, the " point of complete specialisation." [3] If such a manœuvre could ever be successful it would turn the terms of trade against the relatively progressive country, which is presumably better able to bear the attendant real losses. There is thus a sense in which it may be true to say that international balance is endangered by too much autarky in one or both of the major subdivisions of the world.

It would be tedious to ring the changes of all possible configurations in our diagrams, and unpardonable to deduce policy recommendations from them. But enough has been said to show that, even on our level of abstraction, the forces of international structure are an integral part of the picture, and that occasionally they work in a manner that lends support to certain naïve preconceptions which recent theoretical thinking has tended to brush aside.

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[1] In addition, of course, we must know which is the country with the faster rate of progress.

[2] The argument is here confined to case (*a*) for the sake of simplicity; in case (*b*) the converse applies. Apart from the fact that case (*a*) is probably the more usual of the two, its potentialities for international disequilibrium are also the more serious: Terms of trade movements against the *smaller* country are obviously less bearable than the converse, since the smaller country is also the one whose real income is more profoundly affected by the terms of trade.

[3] This applies to both cases (*a*) and (*b*).

REVIEWS

The Theory of Economic Growth. By W. A. Lewis. (London: Allen and Unwin, 1955. Pp. 453. 30*s*.)

It is the great merit of Professor Lewis' treatise on economic growth that it knits together many different strands of thought that have generally been allowed to go unrelated. The process of growth and development is seen as a single phenomenon whether it takes place in developed or underdeveloped countries; whether the point of departure is the firm, the national economy or the world as a whole; whether one looks back a long way to the ancient world, or a short way to the emergence of modern industry in Western Europe, or looks forward to the structural changes that further development will dictate; whether it is technological change that has to be explained or the accumulation of capital. At one moment Professor Lewis is ransacking history to show why and how growth occurs; at another he is deep in the sociology of knowledge and expounding how new ideas originate and gain acceptance; at yet another, he is shaking his head over what governments do, or puzzling over why they do it and why some countries get good governments while others do not. He ranges over the globe for his illustrations with a freedom that even Adam Smith might have envied. Although narrowed in the opening sentence of the book to "growth of output per head of population," the subject matter rapidly expands and the theme of growth becomes progressively universal. Only artistic activity seems to be left out.

It would be possible to regard this very universality of approach as a weakness; and from the point of view of the student who wants a rounded treatment of a series of discrete problems and a set of analytic propositions posing as theory it undoubtedly is. The reader is swept from one subject to another in a steady stream of argument, with no pauses for model-building, and a good deal of turning back towards territory already traversed. The arrangement does not lend itself to normal text-book requirements. But what the teacher may regret, the general reader with some elementary knowledge of economics will applaud. He is offered a book that is meant to be read as a whole, that is abundantly readable, and is full of stimulating comment on matters of great contemporary importance.

The professional economist will be struck first by the novelty of the lay-out. Professor Lewis starts by listing three proximate and inter-related causes of economic growth: a change in the strength of economic motivations; technical progress; and capital accumulation. The first of these is analysed in chapters dealing with "the will to economise" and with the economic institutions that promote or discourage economic effort; then follows a chapter on the growth and application of knowledge; capital is the subject of one chapter, and population and international trade are grouped in the next; finally comes a chapter on government and its power

to influence growth. Professor Lewis is at some pains to emphasise that it is wrong to fasten on any one of these factors to the exclusion of the others and that in practice they are usually self-reinforcing.

A second feature is the complete absence of citations and footnotes: there is not a single quotation in the entire volume. This makes it impossible to know on what authority judgments are expressed or to identify the economists to whom vague allusions are made from time to time as members of this or that school of thought. Even the general reader may be tempted to inquire whether the generalisations that are so boldly advanced would be accepted by other economists. If the book were as lacking in originality or as superficial as Professor Lewis modestly suggests in his Preface, this might not matter; but it just is not possible for anyone of his gifts to write a single page without some arresting statement that a more cautious economist might challenge.

The most arresting generalisations appear in the chapter on capital. There, Professor Lewis argues that " the central problem in the theory of economic growth is to understand the process by which a community is converted from being a 5% to a 12% saver " (p. 226). This process is, in his view, " essentially dependent upon the rise of profits relatively to national income " (p. 236), and this in turn depends upon the emergence of a new class of profit-making entrepreneurs who think in terms of productive investment rather than pyramids, temples and conspicuous consumption. Professor Lewis is obviously a Ricardian at heart, and not content with extolling the entrepreneur and castigating the landlord, is prepared to cast his argument in terms of percentages.

There are several features of his argument that call for comment. It obviously introduces a dichotomy between the theory of growth in underdeveloped countries and the theory as it applies to countries with a large and well-established capitalist sector. This dichotomy is made to originate in a measurable difference in the rate of capital accumulation, although the evidence that there is such a difference or that the difference is a persistent one, or that countries can be simultaneously ranged in order of stage of development and rate of capital formation so that the one serves as a useful index of the other is highly uncertain and is not produced.

Again, does the process of capital accumulation in some way *explain* the process of income growth, or would Professor Lewis' proposition be essentially altered if one viewed capital formation as a *response* to the growth of income? The central problem is surely to understand why there is a spurt in productivity or in the rate of growth of the national income; there are plenty of good reasons for expecting capital to grow at about the same rate as income; but to transfer the focus of interest from income to capital is to grant to capital a dominance over the other factors in income growth that is repudiated elsewhere in the book.

Let us take the second proposition. Is it really true that a growing rate of capital formation requires an expansion in profits relatively to national income? It is no doubt impressive to observe the limitations of the capital

market at an early stage of development and quite right to underline the need for self-financing in the expanding sectors of the economy. But this does not require us to dismiss agriculture as if it were never the most promising sector for expansion; nor need we regard high profits in commerce as the indispensable or most satisfactory preliminary to industrialisation. What matters is where there are unexploited opportunities of remunerative investment. Once these exist, *any* class in the community may seize them and turn entrepreneur; and the very fact that the investments are highly profitable will help to generate finance exactly where expansion requires it.

The third proposition is also open to doubt. A community may be full of " penny capitalists," to use Sol Tax's phrase, whose responses are identical with those of the " new men " who later grow into a capitalist class, but no development whatever may take place. An extreme example is the village of Panajachel studied by Tax; and in nearly all communities there are traders who are quick to seize a profit and would readily engage in productive investment if they knew enough to form a rough judgment of their chances of gain or loss. The problem for them is not one of finance only but of ignorance, inexperience and market limitations. So far as it is a problem of finance, it is often the risks of fixed long-term investment that are the main deterrent and the relatively low return that such investment may carry. This is not a problem that can be resolved simply in terms of the savings habits of different classes of the community.

Of the ensuing argument in which Professor Lewis develops his theory of growth, there is room for comment on one point only. Since development is largely a response to opportunity, those who study it do so mainly in the hope of learning how opportunities of growth arise or may be created. Probably the most powerful weapon is the pressure of demand, and this weapon can most readily be brought into play by inflation. Professor Lewis is obviously tempted to recommend inflation on the grounds that it involves a shift to profits and overcomes financial obstacles to growth. He treats inflation as a kind of race in which beleaguered consumers are ultimately relieved by the new supplies that are rushing along the pipe-lines towards the market. This view of things is not unfamiliar and has some substance in industrialised countries where supply reactions are swift and powerful. But it might have been well to emphasise more strongly the difficulty of keeping inflation under control and using it constructively in less-developed economies.

Growth is an historical, not a purely logical, process; and to understand it calls for a sense of history quite as much as analytic subtlety. But a sense of history is not conveyed merely by historical parallels and illustrations; it is necessary also to divine what in the circumstances of to-day is new and represents a break with the forces operating in the past and what is a continuation of earlier impulses. Is technological progress, for example, the same phenomenon to-day as it was half a century ago? Do we really understand what governs marriage and fertility rates? Is the experience of a country like Japan, which Professor Lewis cites so often, still relevant when

the way of the world seems so different? Must all the stages through which the industrial countries have passed be repeated, the same attitudes emerge, the same conflicts be resolved? Are the shifts in income distribution that Professor Lewis believes necessary on the basis of his reading of the past quite inescapable? Or will our views of growth be transformed by the end of the century as much as they have been since the beginning? If the example of Mill, to which Professor Lewis refers in his Preface, serves as a warning against finality, might it not be useful to dwell at more length on the waywardness of the parameters and the uncertainty of the conclusions?

One last impression remains. The theory of growth is an enormous canvas on which to paint; after all, is not all economic theory about growth except when the possibility is deliberately excluded? If some of the painting is a little sketchy, the whole effect is still remarkable. Few economists could sustain for so long, and with such clarity and good judgment, an argument that embraces most of the major issues of economic policy.

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Contemporary Capitalism. By JOHN STRACHEY. (London: Victor Gollancz, 1956. Pp. 302. 25*s*.)

MR. STRACHEY makes his survey of contemporary capitalism in terms of a critique of economic theories. The vigour and sweep of his treatment is refreshing. Viewing economics from the outside, as an active politician, he sees it in the large and marks the outlines which are generally lost in the controversies of professionals. He shows how the original vision of a harmonious free economy, directed by the hidden hand of competition, has been rendered obsolete by the concentration of modern industry into oligopolies and monopolies. The orthodox marginalist school only distracted attention from the important questions by fussing over minor ones, and to this very day has failed to take note of the mutation in capitalism which makes their elegant logic inapplicable to reality.

Meanwhile Marx had seen the point, but latter-day Marxists have permitted what were plausible observations in 1848 to harden into dogma, and they, too, have been left high and dry while history has changed its course into a fresh channel.

Mr. Strachey's central argument is that Marx was in one sense quite correct in predicting that the purely economic forces of capitalism, developing towards monopoly, would depress the standard of life of the workers and lead to an ever-growing inequality in the distribution of income, but that he failed to take account of the counteracting political forces of democracy and trade-union power, which have in fact succeeded in keeping the share of wages in the growing product of industry more or less constant, and so have fended off the cataclysmic end that Marx foresaw.

> "We reach the paradoxical conclusion that it has been, precisely, the struggle of the democratic forces *against* capitalism which has saved

the system. It has done so not only by making tolerable the conditions of life of the wage earners, but also by keeping open the indispensable market for the final product which the self-destructive drive of capitalism to a more and more inequitable distribution of the national income would otherwise have closed. Thus democracy has had far reaching economic consequences" (p. 154).

As Mr. Strachey later admits (p. 208), this is a somewhat artificial way of looking at the matter. "It may well be that if we treat all the democratic institutions which we have been discussing in the preceding chapters as *a part* of contemporary capitalism: if we treat trade unions, representative institutions with a universal franchise functioning effectively, freedom of speech and of assembly, and the whole mental climate which such institutions produce, together with all the heavy, moulding pressure which they exercise upon the economy—if we treat all this as part and parcel of contemporary capitalism," then the stabilising mechanism cannot be separated off and opposed to a hypothetical "pure" capitalism which could not have survived.

Moreover, Mr. Strachey, giving all the credit to democracy, passes over another influence which might be held to have played no less a part in raising the general standard of life; that is, the spread of family planning to the working-class. When capital (including command over natural resources) is accumulating less rapidly than the population is growing no amount of democracy can do much to raise the level of real wages. But then industrialisation, and the rise in education which is necessary for it, lead to family planning, so that this, too, may be regarded as a part of the system.

Though Mr. Strachey regards it as his main task to account for what must be to a socialist the surprising success of contemporary capitalism, he remains none the less a socialist. This comes out in his discussion of Keynes. Keynes believed himself to be a defender of capitalism. By analysing its faults he intended to show how they could be remedied and the system made viable. But Mr. Strachey points out that once it has been shown that unearned income is not necessary for capital accumulation, that distribution can be moulded by political means, that investment decisions cannot safely be left to the uncontrolled choice of the oligopolists, the justification for capitalism has been irremediably eroded and that democracy can survive only if it presses on towards socialism.

After this point the argument seems to grow less sharp, and the proportion of rhetoric to analysis grows greater. Mr. Strachey promises further studies which will deal with the political side of the subject, but surely in this, the economic, volume he should at least have posed the question, how planning is to be combined with democracy. Planning without democracy is prone to fall into Stalinism, while a form of democracy which permits industries to be nationalised, de-nationalised and re-nationalised according to the fancy of a handful of marginal voters is not propitious to planning. Faced with a choice of evils Mr. Strachey unhesitatingly prefers democracy, but then what about planning? Where do we go from here?

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The Business Cycle in the Post-war World. Proceedings of a Conference held by the International Economic Association. Edited by ERIK LUNDBERG, assisted by A. D. KNOX. (London: Macmillan, 1955. Pp. xvi + 367. 30*s*.)

THE first and longest section of these proceedings consists of a series of papers on business fluctuations in individual countries since the war, with a brief general introduction by Sir Dennis Robertson. The second section contains a more loosely related group of papers on business-cycle theory and its application. Finally, there is a summary account of the discussions that took place at the Conference, prepared by Mr. Knox.

The country papers suffer to a particular extent from the delay of over three years that has elapsed between the Conference itself, held in September 1952, and the publication of its proceedings. Many of the authors describe events in their countries year by year, and the interest of such narratives is inevitably reduced by their stopping in 1952—not an especially significant breaking-off point, as it has turned out. Moreover, the character of events between 1945 and 1952 was such that most of the authors, quite justifiably, are more concerned with problems of post-war readjustment, inflation and its control, and the balance of payments, than with the business cycle as normally understood. Thus only Professor Fellner, on the United States, has any extended treatment of what is normally regarded as the central topic in business-cycle theory, the inducement to invest—a topic which recent developments in Britain and elsewhere have brought back into prominence.

However, there is much of interest in the country papers, and all of them contain material of value for reference. Four in particular may be mentioned. Professor Fellner assesses the relative importance of the various sources from which the post-war American boom has derived its strength: capital restocking, cold war expenditure, residential building, high liquidity, structural changes in the economy. Professor Robinson surveys the balance of supply and demand for resources in the United Kingdom in each of the years 1947–51, with special reference to the relation between expectations (as revealed by the *Economic Surveys*) and events. Professor Lundberg, reviewing the Swedish experience, has interesting comments on weaknesses in the inflationary-gap type of analysis. Professor Tsuru provides an exceptionally lucid account of the different stages in the post-war development of the Japanese economy. The other countries dealt with in this section of the book are Denmark (by J. Pedersen), France (by A. Piatier), Western Germany (by E. Preiser and W. Krelle) and Italy (by P. Saraceno).

The second part of the book contains five papers. Dr. Goodwin's "Model of Cyclical Growth" is already well known. A curious feature of this model is that the desired stock of capital is endowed with an upward trend over time, attributed to innovations, irrespective of any growth there may be in output. An approach more in line with usual concepts of capital would be to regard innovation as causing obsolescence in the existing stock

of capital without necessarily increasing the amount appropriate to any level of output. This would not seem to alter the general working of the model. Professor Klein presents in summary form an econometric model of the United States economy and makes some valuable general comments on econometric methods. Dr. Polak compares two theoretical models of balance of payments behaviour: one, labelled "inter-war," in which imports depend on income (with or without a lag) and hence, via the foreign-trade multiplier, on exports; the other, labelled "post-war," in which imports are a lagged function of the level of foreign exchange reserves (and hence of imports in former periods, as well as of exports). Both models could in principle lead to cyclical fluctuations, but the degree of damping in the two is differently determined. Mr. Kaldor writes on the international impact of cyclical movements and its relation to alternative national policies. Finally, Professor Gordon, in a paper that may be regarded as complementary to Professor Fellner's, discusses investment opportunities in the United States before and after the War. In this paper the author carries into practice, with illuminating results, the disaggregation to which so many participants in the Conference pay lip-service.

The record of the discussion is well arranged and is among the most interesting parts of the book. Less disagreement than might have been expected was displayed about methods of research, and controversy centred chiefly on questions of policy. On the basic issue whether and in what sense "the" business cycle has persisted in the post-war world, the participants simply lacked the evidence to do more than make guesses, just as a similar assembly of economists would have done seven years after the end of the First World War.

R. C. O. MATTHEWS

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Uncertainty in Economics and Other Reflections. By G. L. S. SHACKLE. (London: Cambridge University Press, 1955. Pp. xv + 267. 25*s*.)

THIS volume is a collection of some of Professor Shackle's papers from 1939 to 1953; about half of them being developments or explanations of his theory of expectations, and the rest making frequent reference to his profound conviction of the importance of uncertainty in the economic system. This is a matter on which he is on strong ground, and his critics have never really attempted to assert that economic models which give no place to uncertainty can be realistic. But such models continue to be devised and used; the influence of the way in which people think of an uncertain future is regarded as itself so uncertain that it must be swept aside or treated as a casual irregularity or a frictional loss. Professor Shackle's theory of expectations is still regarded as an interesting possibility, but not one of which much use need be made; and yet there has been little effort given to the propounding of rival theories.

This is disappointing, but a reading of the first nine essays in the book suggests a reason. This is not a field of study in which a new theory can have strong claims to immediate acceptance; it is not even certain how it can be tested, nor what range of alternative theories can fit the facts. When the first dust of controversy has settled, therefore, there is a need for people to get together to find the highest common factor of agreement—to see which of the new ideas are acceptable to all, and which are still uncertain. But Professor Shackle—I hope I do not do him an injustice—still gives the impression of campaigning for his theory, the whole theory, and nothing but the theory. He concedes very little to his critics; in his justified attacks on the follies of those who apply frequency-ratio probability to unique situations, he gives little attention to the tradition of another interpretation of subjective probability. He prefers to stand alone, and in so doing makes it difficult for the subject to advance by agreed improvement and amendment.

But in expounding his own ideas he has the invaluable service of a command of the English language such as few economists since Marshall have possessed. He is a master of the homely but apposite example (see, for instance, the remarkable suitability of the quotation on p. 3); he can lighten his argument by the sudden literary allusion, bringing in the Ancient Mariner or a clerihew with the deftness of Professor Robertson quoting Lewis Carroll. Like the psalmist, he is sometimes repetitive, driving home his points by the repeated light blows of a well-aimed hammer. The advantage of his style is nowhere better illustrated than in his final essay, on " What makes an economist? ", which deserves long use as a tract for those aspiring to academic honours.

But perhaps the central section of the book, containing Professor Shackle's 1949 paper on the Nature of Interest Rates, opens up the most interesting possibilities. The theory of the rate of interest has been worked over so often that it might seem that there is little more to be said, and yet it is still divided by a great gulf from the explanation of what happens on the London Stock Exchange. Professor Shackle's view is that interest is mainly a manifestation of uncertainty, and he supports his argument by an examination of yield structures in 1945–47. There is good reason for further work along this line, not only to strengthen knowledge of the determinants of interest rates, but because the Stock Exchange probably provides the fullest and most easily used data for the testing of rival theories of expectations.

The remaining articles include two on the Multiplier; a sympathetic exposition of Myrdal's book on *Monetary Equilibrium*, which Profesor Shackle considers to have been neglected because it was published in English on the eve of the war, and a small exercise in algebra on " the deflative or inflative tendency of government receipts and disbursements." Professor Shackle deserves, for the whole, congratulations on having attained the dignity of an anthology, and it is to be hoped that it will be but the beginning of a series.

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Marginal Cost Price—Output Control. A Critical History and Restatement of the Theory. By BURNHAM PUTNAM BECKWITH. (New York: Columbia University Press, 1955. Pp. 283. 45*s*.)

MOST economists will find this an irritating book to read. Dr. Beckwith regards the marginal-cost principle of pricing and output determination as the most important discovery of economics in the years 1933–48 (p. 168), and treats it with an earnestness and reverence almost amounting to fanaticism. He distinguishes carefully between "capitalist" and "socialist" economists, and implies considerable tendentiousness in the former group. In the long discussion of the history of the doctrine he treats some writers so roughly (and frequently so unjustly) as to invite the same treatment of his own work. He claims to be a logical positivist, yet speaks of "the verification of ethical propositions" (p. 163) and accuses Bergson of believing "that economic policies, including that of marginal cost control, are sound only if the results which they produce are approved by priests and philosophers." He admits to an ignorance of calculus, yet seems to understand sufficient of mathematical technique to reach the conclusion that when mathematical reasoning "yields correct results, it always begs the question by using assumptions which imply the desired conclusion" (p. 133). Verbal techniques are apparently immune from this objection. He nowhere proves the main proposition that marginal-cost pricing is desirable, and much of the book lacks the rigour we nowadays expect from works in theoretical economics.

Yet with all these shortcomings, it is an interesting, even a stimulating book. It may also serve as a useful introduction to students, provided some of the mistakes are pointed out to them. Dr. Beckwith puts forward the following main propositions: (1) that the relevant marginal cost for the "rule" is "the current cost of the intensive margin," that is, the cost of additional factors hired to produce an additional unit; (2) that the concept of long-run marginal cost is meaningless; (3) that the theory of optimum capacity is distinct from the theory of marginal-cost pricing; (4) that deficits in increasing returns industries are due to the carrying out of an optimum investment programme, and not to the implementation of the "rule," and (5) that interpersonal comparisons of utility are feasible. He also derives nine corollaries from the main "rule," which are more or less obvious.

The discussion of the "relevant" marginal-cost curve is marred by a confusion between lumpiness and delays. The long-run marginal-cost curve may differ from the short-run curve because, as Marshall argued, it takes time to increase the size of plant, or because, say, it takes time to attract more labour of sufficient skill. Dr. Beckwith, with one exception, assumes that all investment is lumpy, so that the cost of extra plant cannot be imputed to any one unit increment in output. This has always been recognised. Yet the problem of which marginal cost, long or short (when a valid distinction exists), to charge remains. It is not true, as Dr. Beckwith argues, that once a piece of equipment has been acquired, its cost is fixed and cannot

enter variable cost, since this ignores user cost. Nor is the implied principle sensible in a society where wage contracts are weekly and raw-material contracts are also used. For if it is true that once resources have been committed for any length of time, their costs should not enter marginal costs, most goods would be free. If an industry attracts resources to itself, the *ex ante* cost to society is not only the other goods given up now, but also in the future. Why the future should be ignored it is difficult to see.

On the other hand, the lumpiness problem remains, and Dr. Beckwith is perfectly right in arguing that lumpy investment decisions require comparisons of lumpy returns and costs. However, he deliberately ignores what Professor Lachmann has called Investment repercussions in framing his optimum investment rule, in the belief that the phrase " increase in productivity " is a simple and self-obvious one. None the less, Dr. Beckwith has performed a service, in making clear that many of the problems of marginal-cost pricing are really problems of lumpy investment decisions.

Dr. Beckwith is at his best when attacking the average cost equals price school. His argument that the definition and measurement of average cost in practice is likely to be more difficult than similar marginal-cost definitions and estimates is very convincing. He is at his very worst when defending the marginal cost equals price rule. He states that the " basic reason (for the rule) is merely that real benefits should be equal to real costs at the margin because this maximises welfare " (p. 194) and then " demonstrates " this by showing that when all prices equal marginal cost, the marginal-value productivity of variable factors is the same everywhere. That the introduction of the rule will produce considerable changes in the distribution of welfare, that even granted the comparability of the welfare of different individuals, such welfare must also be ascertainable, that poll taxes clearly cannot redistribute income, while profit and inheritance taxes (suggested by him) violate the basic optimum rule, of all this he is quite unaware. In short, the basic proposition of the book is continuously asserted, and never proved.

This review has been mainly critical, but it would be a pity if Dr. Beckwith's book were not widely read, for it deals with topics of great importance, and as already mentioned, if it does not convince, it certainly stimulates.

F. H. Hahn

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Introduction to Money. By Honor Croome. (London: Methuen, 1956. Pp. vii + 209. 10*s.* 6*d.*)

Mrs. Croome has written an attractive book dealing principally with the nature and development of money, but ranging also over a wide field of national and international economic activity. Introductory volumes tend to be of two types: those which concentrate on theoretical concepts and their inter-relationship as elementary models, and those in which the analytical skeleton is pushed into the background, well-hidden by description and

narrative. The former is mainly of use to the university student, as the first step in a large systematic course; the latter serves best the intelligent general reader. Mrs. Croome's book is of this second type; the professional reader will always be conscious of the intellectual scaffolding in the background, but it never obtrudes. Analysis, description and historical narrative go always hand in hand. Yet superficiality, the danger of this approach, is avoided, and the reader, while he is guided away from the obscurities and difficulties in the subject, is at the same time properly made aware of their existence. The style is clear and energetic, and good use is made of vivid analogy and example.

Part I of the book deals with the essential properties and the development of money and credit, the familiar story being well told so as to bring out (as originally did Menger) the position of money as the asset with the greatest degree of marketability. The following part deals with the banking system, and Part III leads off into a discussion of how the value of money is measured, and, afterwards, of the causes and the effects of changes in its value. The lay reader is likely to find this the most difficult part of the book so far; in the account of how the general price level is determined an intricate argument has had to be much compressed, and, if one recalls the average freshman's initial confusion over the notions of saving and investing, hoarding, lending, spending and the like, one wonders how much an ordinary reader will genuinely understand of it. It is perhaps a pity that " The Value of Money; Causes of Change " is discussed in Chapter ix before " The General Theory of Keynes " is dealt with in Chapter xi. The main trouble, of course, arises not from defects in Mrs. Croome's exposition, but simply because it is hardly if at all possible to get a true and useful understanding of such complex economic processes without employing explicitly a technical apparatus—without, that is, some more systematic study of theory.

In her discussion of the aims and means of monetary policy the author is in no doubt about the need for active management, but stresses that objectives should be modest and has much that is sensible and balanced to say about the reconciliation of high employment with flexibility and price stability. The reader may disagree with some minor points of the exposition of the mechanics of monetary control; the argument, for example, on p. 134, that open-market policy ceases " outside quite narrow limits " to be purely monetary policy, because it is said necessarily to cause a Budget surplus or deficit, did not convince the present reviewer. On another point, is it correct to give the impression (p. 124) that inflation will be worse if there are monopolies to exploit the sellers' market? It is easily conceivable that the monopolist's prices would rise less fast than those of competitive business. But these errors, if indeed they are errors, leave the general discussion unimpaired.

Part IV covers the foreign-exchange market, the gold standard, exchange control and post-war international institutions. This in itself is surely very wide, but there is also, in the chapter on exchange control, a very useful discussion of the post-war economic situation in the United Kingdom, and

of how, " taken together, the comparison of money earnings and money assets with price tags of all kinds—including the price tags, at the official rate of exchange, of foreign goods and services, gave the British public, individual by individual, a totally misleading message," so that a false idea of potential economic prosperity was easily engendered. In this Mrs. Croome's sure grasp and expository power are seen to excellent advantage.

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An Introduction to British Economic Statistics. By E. DEVONS. (London: Cambridge University Press, 1956. Pp. vii + 255. 22*s.* 6*d.*)

THIS book will be of considerable use to many people and will doubtless need a second edition. The latter fact must justify a review which may seem ungenerous in its concentration on the scope for further improvement.

In the preface Professor Devons describes his objective as " to fill the need for a book which provides the [first- or second-year] student with a general survey of the main British economic statistics—tells him where they can be found, what they mean, what problems arise in using and interpreting them, and guides him in further reading and in consulting the original sources themselves." At the same time he firmly expresses the view—with which anyone who has tried to teach applied economic statistics will agree—that the best way for the student to learn to handle economic statistics is by actually trying to do it himself; consequently the book " is meant to guide the student in using original sources, rather than merely to enable him to acquire a superficial acquaintance with them at second hand."

This objective is a complex one, and it seems to me that Professor Devons has not been consistent in the role which he intends the book to play. This does not prevent it from being a very useful one, but it means that the teacher should think rather carefully, chapter by chapter, how he should tell the student to make use of it. An unaided student will, I fear, usually get far less benefit from it than he might, and its emphasis on pitfalls may make him discouraged with the whole subject.

There are many possible ways in which one might try to write a book to help the student, but perhaps the one which follows most naturally from the declared objective would be the " subject " approach. As a rule a student who wishes to use statistics in an economic problem will need information about a particular subject—employment in the cotton industry, for example —and guidance on how to use it; he will not be starting with the idea of learning something from a particular source-book, such as the Census of Production. On this plan therefore the author would arrange his book in a number of sections and sub-sections dealing with particular subjects, and under each would let the reader see, quickly and easily, what was available on that subject in the main source-books—very probably a semi-tabular form would be best. There would usually need to be an introductory discussion of general points relevant to the use of such figures—for example, the different

meanings of " employment "—and some notes on the reliability of the particular sources. Where different sources provide information on the same subject (as is the case with employment in the cotton industry) it would be helpful to give some guidance as to the types of problem for which each is most suitable, and what the student should do when they appear to give different answers.

An alternative approach would be *via* the source-book, instead of the subject. Each of the main primary source-books would be considered in turn, and the student provided with a guide to the usefulness and snags in the main tables. This would fit naturally with Professor Devons' second idea of providing something to help the student in using source-books: the " guide " would hardly be readable without the source-book, and the student would have to find his own way to the right source-book.

Perhaps inevitably, Professor Devons has compromised between these two approaches, sometimes putting the emphasis on one, and sometimes on the other. But he seldom does as much comparison of different sources as the " subject " approach would suggest; and in the course of compromising he has introduced quite a lot of material which seems of little use except to give the reader that " superficial acquaintance at second-hand " which he so rightly deplores. Thus the chapter on Population starts with several pages of textual description of various publications of the Registrars-General, which would be of less value to a student trying to find out where to look for information about any subject than a simple list (let alone something arranged by *subject*), whilst anyone who had found the source-book could see what was in it much better from its table of contents. The second edition of the book would gain from a ruthless application of the question " Is this what a *user* of the source-books wants to know? "

My other suggestion is that Professor Devons should try to make the whole outlook of his book less negative. Time and again one is told that " these statistics must be used with the greatest caution," or that " attempts to do this are most dangerous "; at a rough estimate, there are perhaps a hundred such warnings in the book. Very seldom indeed is the student given an example of an important conclusion which *can* be deduced—the emphasis is all on snags rather than uses. Moreover, he is seldom given any guidance as to what he should *do* in the face of these warnings—whether the figures in question can be used as a broad indicator of movement, but not as a measure of absolute size, or whether it is only *for beginners* that it is " very dangerous " (p. 141) or " most dangerous " (p. 166) to attempt to see what is happening to the current balance of payments by using the monthly trade returns.

I for one would not like the student to feel that this twice-repeated warning will continue to apply even when he has become experienced in preparing tentative estimates by less crude methods than Professor Devons apparently assumes to be used (judging by the very tendentious statistics quoted on p. 167 to support his warning). And I would like Professor Devons in his second edition to face the fact that in the real world it may be necessary to take decisions which should depend (for example) on one's view as to what is

happening to the current balance of payments, and that if the trade figures are clearly showing a marked change (as in 1951 or 1956) it may be much *more* dangerous for the statistician to profess complete ignorance on the subject than to make a tentative estimate.

Taken as a whole, the book as it stands is probably of greatest value to somebody who has been using economic statistics for some time, including the would-be teacher who needs to consolidate and systematise his knowledge. For him the concentration on snags and limitations is correct, since the statistics themselves and their uses are broadly familiar to him; for the student who has not yet met the statistics it seems better to start with more about uses, and not to imitate the Latin grammar's emphasis on exceptions rather than rules.

There are, however, chapters which are admirably suited to the beginner's needs, notably Chapter VIII (Incomes) and Chapter IX (National Income and Expenditure), and the part of Chapter VI which deals with the balance of payments. Professor Devons is very good at explaining the broad plan of such things as the capital account in the balance of payments, and showing how the different parts fit together conceptually and what problems are involved: all these parts are excellent for the student to read before he tackles the statistics, and to re-read after he has made his first mistakes.

In brief, the book is undoubtedly a useful one, on a subject which has not been well covered in the past; I hope that the second edition will be even better.

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Short-term Economic Forecasting. By the Conference on Research in Income and Wealth of the National Bureau of Economic Research, New York (Editor L. R. Klein). (Princeton: Princeton University Press, 1955. Pp. 506 + xi. $7.50.)

This report of the NBER provides the reader with seven papers delivered to a conference on research in income and wealth, and with comments by other participants (and sometimes replies by the authors) which often add a good deal to the value of the papers. The subject is of great importance, and the contributors experts in their fields—often with first-hand experience of conducting the various surveys, etc.—who dealt with their subjects clearly and well: it is all the more to be regretted therefore that the report of a conference held in September 1951 should bear the publication date 1955 (and in fairness perhaps the reviewer should apologise for taking six months to deliver his MS.). The passage of time has certainly not rendered the material useless, but inevitably the reader wonders (for example) how far the authors were right in attributing certain results to the peculiarities of the immediate post-war years, or in entering *caveats* against assuming comparable results under other conditions; and at least one author refers to his paper as

an interim report, so that the reader is left in doubt as to whether a final one has appeared and perhaps altered the provisional conclusions.

Nearly all the papers are concerned with the collection and use of "forward" figures from consumers or businesses. One has to be very careful about the language which one uses about these figures, because a good part of the problem turns on what they are supposed to represent, and whether they do or can. But in nearly all cases they are figures about the respondent's own activities—his capital expenditure (or his firm's), his shipments, his purchases of consumer durables. The authors refer very little (and then in rather unflattering terms) to the collection of estimates about the future level of the GNP or of business activity, etc.

In principle these forward figures might, at one extreme, represent firm decisions by the respondent about his future action, which cannot (or at least will not) be varied significantly one way or the other, whatever may happen to the national economy or the industry in which the company operates; some capital expenditure may fall in this category, though it is clear that it is not all as predetermined as a forecaster would like to assume. In this type of case the respondent can give an accurate answer, and the forecaster can enter the results in his tables without any allowance for the influence of other elements on this one.

At the other extreme are figures for things which depend predominantly on what happens in the economy as a whole, so that the replies are "estimates" or "forecasts," not "plans," and the accuracy of an individual respondent (or even the average of the group) depends fundamentally on his ability to forecast something for which he has no special expertise. Such figures are of no direct value, but they might be of some use to the forecaster if they in fact influence the respondent's behaviour in some way—*e.g.*, sales forecasts by retailers might be no use for forecasting retail sales, but may be a good guide to retailers' *purchases* over a short period.

In general, of course, the figures which are collected contain some elements of definite plan, some of contingent plan ("I will buy if things go well" —but the conditions are usually not precisely formulated), and some of pure estimate—with the basis for these estimates being partly things about which the respondent is in a good position to take a view and partly general developments in the economy. There is thus great scope for discussion and experiment about what to try to collect, how to do it and how to use the results. In particular, are the forecasts which one makes by aggregating these individual figures (perhaps with some allowance for a consistent bias, if past experience will provide a formula) a sufficient improvement on those made without them to justify the work involved?

The papers in this volume throw a great deal of very valuable light on such matters. Negatively, one may take the analysis of quarterly "shippers' forecasts" which had been collected by a fairly elaborate procedure ever since 1927 for the very practical purpose of helping the railways to arrange for the right number of freight-cars to be available. Here it seems that the aggregated results were markedly less accurate than those which one could

obtain in a few minutes by the simple device of assuming that the coming quarter would show the same percentage increase compared with a year ago as the latest one; the examination of the biases is most instructive, but the authors found no formula for allowing for them which would make the results of real use.

Positively, the " forward figures " for capital expenditure by businesses both in the United States and in Canada seem to have been of real value, and perhaps the most stimulating parts of the book are the ones which show how, in each country, the accuracy of the aggregates emerged from individual returns which showed wide discrepancies. The authors do not altogether escape, however, from the language pitfalls in discussing these results. Particularly on the American form the instruction is to give " estimates of costs which according to present planning will be incurred," so that if this is taken literally a firm which does little planning for more than six months ahead would be quite correct in giving a figure well below the actual out-turn; moreover, a very alert firm which revised its plans in mid-1950 because of the invasion of Korea must similarly not be classed as a " poor forecaster " because its figures were " too low "—it was not asked for a forecast. In effect, it seems that the Canadians were more logical in asking for " estimates of expenditure," which can reasonably cover the minor items which several American commentators note as being omitted because " not scheduled (by the firms) in detail," and a reasonable allowance for contingent items. But the central forecaster must recognise that such figures will not be firm ones, which the respondent intends to hold to under all likely circumstances; even if they were, his forecast might still be upset by such things as delays in delivery of machinery.

With capital expenditure it seems that there is sufficient firmness about next year's figures for them to be of real value, even if the general economic developments are not exactly as foreseen (but not, of course, if Korea is invaded); at any rate, nobody at the Conference seems to have produced a method of forecasting which would give as good results (*e.g.*, by a formula based on profits or trends in production). And the Canadians clearly attached importance to the detailed figures for industries and regions which they produce.

With consumers, however, the picture is not so clear. Everyone welcomed data about liquid assets, income changes and perhaps individuals' general assessments of their financial position. But statements about future purchases of automobiles and durable goods for a year ahead get a mixed reception, and the re-interviews made it clear that there is not much " plan " about these statements: in particular, table 25 on p. 419 shows that over half the new cars bought in the year, and over three-quarters of the used ones, were bought by people who had been classified in the category " Do not expect to buy new or used "—not even in " Undecided." Miss Brady's comment on p. 489 suggests that other simple methods would give better results than the individual consumers' estimates, and the reader should on no account miss Tobin's comments on the general issue (pp. 444–50), forcefully

illustrated by the statement that in predicting funeral expenditures one would gain nothing by asking consumer units their plans. However, Schweiger's table on p. 461 provides supporters of consumer surveys with useful material, and the real issues are probably *what* data to collect from consumers and *how* to use it. On this matter experience since the Conference may well have shed further light.

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World Population and Resources. A Report by PEP. (London: Political and Economic Planning (distributed by Allen & Unwin), 1954. Pp. xxxvii + 339. 30*s*.).

PEP enjoys a reputation for the careful presentation of burning problems. The problem they chose for the present book is burning indeed. It concerns the steep rise, since the War, in the annual growth of population in underdeveloped countries. Unfortunately this Report fails, in my view, to reach the high standard customarily associated with PEP. Its treatment of the economic problems arising from the change in the rate of growth seems to me inadequate and often questionable.

Most of its space is taken up with passionate pleas for the introduction of birth control in these underdeveloped areas. It tells the reader little about the world's resources and the nations' ability to develop them. Only about a quarter of the volume deals with resources or other economic aspects of the accelerated rise in population. One-third describes legislative measures by which the governments of six different nations have tried to influence their respective birth-rates. The balance is taken up with descriptions of the impact of the medical revolution on a number of supposedly representative regions—many of which are only doubtfully representative—and by recommendations of policy. This review must limit itself to the handling of the economic problems created by the medical revolution.

There is undoubtedly here a major problem. The great medical advance in lengthening the expectation of life, made recently with the aid of North America and Europe, has not been, and cannot be in the near future, balanced by a corresponding decline in births among tradition-ridden peoples. A time lag is unavoidable, leading to a sudden quickening of the rates of population growth, and creating in turn many economic problems, of which the finding of sustenance for the extra mouths is only one. But instead of an examination of the manifold problems arising and of their possible solutions, we are offered vague *dicta* to the effect that unless a rapid decline in birth-rates is achieved, the standard of living will fall, a "standard" that takes no account of the boon of seeing most of one's children grow to maturity.

PEP have spotlighted the challenge with which the second half of the twentieth century will be faced. They missed their opportunity by failing

to examine whether modern man generally, and the underdeveloped nations in particular, can rise to it. Nothing is more unreal than projecting into a far future tendencies which appear for the moment to produce a disequilibrium, and inferring therefore an ever-widening gap. It overlooks man's ability to respond to a challenge and to adjust to new conditions.

The PEP Report reasons as follows: world population over the next, say, twenty-five years will grow at a rate of 1·3% per annum, but food output must grow at 2·25% per annum in order to make good the present, assumed, underconsumption. Such an increase having never previously been achieved, it cannot be achieved in the future. *Ergo* starvation, unless the rate of population growth is reduced.

The rate of 1·3% need not be questioned here, although predictions by experts in the past have often gone awry. But a minimum rate of increase in food production of 2·25% (75% more rapid than of mouths) is questionable. It is derived from an estimate of calorie intake, without considering the contradiction between supposedly unbearable malnutrition and the facts of rapidly increasing health and life expectation. Still more questionable is the contention that an increase of 2·25% cannot be obtained in future because it is unprecedented. Not only had the Report to admit, almost in the same breath, that for many important foodstuffs much higher rates had in fact recently been achieved, but it overlooked completely that the conditions which kept output below a growth rate of 2·25% in the past, have themselves been radically changed by the very fact of the increase in population growth, as well as by the new factor of international co-operation and the quickened dissemination of knowledge. The Report does, it is true, record the beneficent effect of the medical revolution on people's working capacity, but gives this only scant attention. Generally the authors seem to ignore the fact that with every new mouth goes also a pair of hands and a brain.

In the second place, the PEP Report argues that, if we look, say, two generations ahead present known reserves of some of the more important metals, including copper, lead, zinc and tin, will be approaching exhaustion as the result of rapidly increasing consumption, and that their " real " costs will rise so steeply as to make future supplies of manufactures doubtful. The Report fails, however, to give any measure of the (consequent) increase of " real " costs or evidence of their rise. It admits that there will be no lack of energy; this admission, reflecting the progress in nuclear science, to my mind throws doubt upon the whole line of reasoning of the PEP Report. I would argue that, if energy is abundant and scientific knowledge is advancing, the " real " costs of energy and minerals—the measure of which is human effort—are bound to decline, as indeed they have throughout this century. Thus I would myself expect that future supplies will not in practice fail, since only a fraction of the earth's deposits have so far been exploited; " real " costs have been the limiting factor. If energy, minerals and manufactures can be made abundant, so, I feel confident, can food, the output of which is a function of these three variables, with knowledge added as a

fourth. Thus I myself arrive at the opposite conclusions from those of the Report. The authors have whetted my appetite, but they have given me something that I find good only in parts.

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London.

Labour Policy in the U.S.S.R. 1917–1928. By MARGARET DEWAR. (London and New York: Royal Institute of International Affairs, 1956. Pp. viii + 286. 45*s.*)

Some Problems of Incentives and Labour Productivity in Soviet Industry. By G. R. BARKER. (Oxford: Basil Blackwell for the Department of Economics and Institutions of the U.S.S.R., University of Birmingham, 1956. Pp. xii + 131. 14*s.*)

THESE two books are alike in being research studies in the field of labour policy in the U.S.S.R.; the first conducted under the ægis of Chatham House, the second opening a series of monographs emanating from the Birmingham Department of Economics and Institutions of the U.S.S.R. under Professor Baykov's editorship. In other respects, however, they are dissimilar.

Mrs. Dewar, while ranging over all aspects of labour policy, from wage payment and factory committees to social insurance and labour legislation, concentrates on giving a systematic historical record of ten years—ten crucial years, certainly, that witnessed some striking changes and contrasts—and nearly half the book is occupied with appendices (including a detailed list and summary of all Labour Decrees during the period, including the Labour Codes of 1918 and 1922, which will lay future students of this subject and period greatly in her debt). Of particular interest is the summary of the reports of the trade-union congresses of the period and of discussions of trade-union and labour questions at Party congresses. Just occasionally one has an impression of losing one's way among the trees, and Mrs. Dewar may perhaps be too inclined to blur the distinctions of viewpoint in the crucial trade-union discussion of 1920 which preceded NEP—also in general to play too much on the contrast between design and achievement. But on the whole commendable discrimination and clarity are preserved.

Mr. Barker's treatment is also historical in that he divides his study into four main periods between 1917 and 1950; but although he has concentrated on a single theme, his treatment is generally much slighter. His account is interesting enough, and is presented readably on the whole; moreover, one gathers that the author has thought about his material and is more interested in the ideas behind the policies he describes than in composing a systematic chronicle, or in giving quantitative precision to his conclusions. Yet one cannot altogether avoid the impression that he may have fallen between two stools, and finding himself with too much material for an article or paper have ended up with being rather too lightweight for a book. Nor is Mr. Barker consistently lucid in his exposition, especially of such theoretical points as he touches: for example, his reference to the

index-number problem on pp. 3–4, which contains a curious remark about measurement of output at constant prices causing weights to be " distorted " because the " price remained fixed "—a defect which he seems to suggest would be removed by " calculations based on changes in labour content." There are some other cryptic passages in the Introduction (*e.g.*, on pp. 8 and 10). In this connection one is rather surprised that in a monograph about productivity no account is given of the Soviet method of calculating labour productivity and of discussions about this (of which there is a fairly full analysis in a work that is mentioned in Mr. Barker's footnotes—Volume iii of A. I. Rotstein's useful study of Soviet industrial statistics). It is also to be regretted that, although much is said about payment by results, there is no more than a quite brief description of the actual systems in force and their adaptation to different kinds of work.

The transition from wages-in-kind and " levelling " and " obligatory labour service " under the scarcity-conditions of " war communism " to a labour market and collective bargaining under NEP, and then again from Tomsky's " wage-levelling " to the widening of differentials in the thirties, are conveniently and concisely sketched. In the concluding section on the present situation there is an interesting summary of the worker's position in Labour Law (which is a branch of law separate from Civil Law), in the course of which reference is made to the partial repeal in 1951 of the 1940 Decrees (penalising change of work without permission and absenteeism), which preceded their final repeal this year; and there is also some account of non-financial incentives and the methods of " norm-fixing " (where it is concluded that " nothing *new* of any significance has emerged ").

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Income and Wealth : Series IV. Edited by Milton Gilbert and Richard Stone for the International Association for Research in Income and Wealth. (Cambridge: Bowes and Bowes, 1955. Pp. xii + 388. 42*s.*)

This volume contains ten selected papers presented at the third conference of the International Association for Research in Income and Wealth. Four papers—by R. Frisch, Stone, Schouten and Lips, and Stuvel—deal with the relation between social accounts and policy-making in the United States and Western Europe. Two papers, by Marczewski and E. F. Jackson, discuss the related topic of the form and uses of social accounting in communist countries. Two papers, one by Deborah Paige and Adler, and one by Milton Gilbert and Kravis, are concerned with problems of international comparison and one, by J. L. Nicholson, with comparisons of real product over time. A final paper, by R. Goldsmith, describes the application of his technique for establishing a national balance sheet for the United States. Like its predecessors, this volume is invaluable as a survey of recent develop-

ments in the application of social accounting in a number of countries and in a variety of fields of study.

The common theme of six of these papers is the practical uses of social accounting. From this volume, readers who are not specialists in Soviet economics (which, unfortunately, means most people who cannot read Slavonic languages) can get some impression of the differences, and similarities, in the techniques of applied economics between communist and western countries.

In his remarkably comprehensive survey of recent work on " model building," Stone emphasises the distinction between fiscal policy or growth models, which concentrate on the determinants of final demand, and treat resources as, broadly, homogeneous, and technological models, based on input-output tables, which concentrate on changes in the uses of specific resources. In the west, the operational use of social accounts is for the most part restricted —by the limitations on Government action—to the fiscal policy model. The function of Government is primarily the maintenance of general equilibrium; the main object of social accountants is to produce an accounting structure which is comprehensive and internally consistent and which will illustrate, in aggregate terms, the broad effects of government policy, and of changes in, for example, final demand and incomes. The papers by Frisch, Schouten and Lips and Stuvel show how social accounts are used, and could be developed, for this kind of purpose, drawing on the experience of Norway and the Netherlands. The technological type of model, although invaluable for subsequent explanation of what happened, is only in limited ways useful as a guide to policy. (Had input–output analysis been sufficiently developed, it might have had very great operational significance in war-time.)

The emphasis in communist countries is reversed. From Marczewski's and Jackson's papers it appears that the crucial operational statistics—those on which planning decisions are based—are the " material balances " which concentrate on the technological relationships. These are essentially commodity flow tables, showing actual and projected supplies of a given product against its various uses, and are thus half-brothers of western input-output tables. They cover both intermediate and final products (such tables are drawn up for about 1,600 separate commodities in the Soviet Union) and their form, and use, would no doubt be clear enough to anyone familiar with war-time allocation procedures in the United Kingdom or the United States. Similar tables are compiled for man-power (resembling the United Kingdom man-power budgets).

Since economic planning rests so heavily on these material balances, which are set up in physical units, the statistics of national income and expenditure, and of national output, appear to play a relatively small part, and less attention is devoted to the purity of the concepts. Thus, the well-known restriction of the calculation of total national output to physical commodities (plus certain services, such as transport, required by industry) seems to be justified partly on the ground that it covers all branches of the

economy which are worth planning, in the sense that they raise problems of technological relationships susceptible to policy decisions. The justification sometimes given—that the omitted economic activities, such as government administration and much passenger transport, are really intermediate and not final services—may be less important. This theoretical justification certainly makes it difficult to understand the omission of, for example, communal baths and art galleries, and it is clear from Marczewski's and Jackson's papers that the communist economists are themselves in conflict about just where the " boundary of production " should be drawn.

It is interesting to see that the problem of forecasting consumption patterns is dealt with by communist planners, as in the west, by demand analysis based on family budgets. In present conditions, however—or because, some may say, the problem of monetary equilibrium has been neglected—forecasting errors are not likely to lead very often to excess supplies. On the other hand, it is clear that no attempt is necessary in communist countries to forecast capital investment as a dependent variable; from the point of view of the communist planning technician, it is an independent variable—but one given by a committee decision and not an economist's judgment about probable business behaviour.

It may be added that Marczewski's paper is wholly methodological; Jackson's paper includes a survey of the social-accounting statistics actually available for Eastern Europe (but not the U.S.S.R.), and is useful background for the publications of E.C.E.—the only current source for a conspectus of these statistics. The recent publication of a statistical year book for the Soviet Union leads one to hope that it may now become possible for the non-specialist to go beyond speculative theorising about the techniques of communist economic planning.

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Individuals, Groups, and Economic Behavior. By ADDISON HICKMAN and MANFORD H. KUHN. (New York: The Dryden Press, 1956. Pp. xvii + 266. $4.75.)

IF a librarian, in his list of classified new arrivals, were to introduce a category " Librarian's Nightmare," this book should be included. The preface is an essay on the borderlines of economics and on that no-man's land which lies between economics and neighbouring disciplines. The first chapter sets out to give a survey of modern psychology with special reference to the theory of Freud, the field theory, the learning theory and the authors' own " self-theory."

Two chapters deal with the behaviour of the firm, particularly with managerial behaviour and with the influence of taxation on initiative. Another chapter discourses on the problems of consumers' satisfaction. From there the reader is taken to a discussion on planning and freedom. The book concludes with a description of a new method of research invented and

used by social psychologists. Strangely enough, the subject of industrial relations, of equal interest to social psychologist and economist, is omitted.

In spite of its weaknesses, this is a book which should not be dismissed lightly; for it contains a message. The message is simple: economists and social psychologists should work more closely together. The economist constantly oversteps the boundaries of pure economics: he deals with human behaviour be it that of consumer, manager or worker, his preferences, satisfactions, wants and needs. On the issue " planning versus freedom " the swampy field of values, of politics has been entered. The social psychologist offers his help in testing the economist's hypotheses on human behaviour.

As soon as so generous an offer is accepted the difficulties in forging links between disciplines emerge. One of the main obstacles is the special terminology used in each field. " Rationalisation " means something very different to the economist and to the psychologist. To the economist, many of the terms of social psychology used in this book are, on first sight, meaningless; for instance, " afferent neural interaction," the " stimulus-response-paradigm," " status personality " and " authentic personality," " semistructured " and " unstructured " situations, " extremes of societal continuum " and " physiological correlates of specific goal-directed activities." Research methods include " coefficients of reproducibility." A footnote containing the remark " what the symbolic interactionist calls a theory is, to the self-theorist, merely an orientation " may serve as a warning example of barriers set up against communication between disciplines.

However, contact with the jargon of other faculties brings its rewards. We are, for instance, introduced to the concept of " relative deprivation," which deals with the relation between the promotion of the few and the discontent of the many. It appears, from a study of United States service men in the Second World War, that the discontent of the unpromoted was felt most acutely in those units where promotion was most frequent. The concept applied to economics would throw new light on problems connected with special rewards, incentives, promotions and other discriminatory improvements.

The chapters on managerial behaviour suffer from the slightly misleading title of the book. Examples given are limited to the United States, while human behaviour, after all, is not. These chapters, based largely on public opinion polls, do demonstrate a not entirely new but essential truth: that profit maximisation can be only one of the many factors determining managerial decision making. Other factors investigated are power, prestige, creativity, success, sense of responsibility, public approval, loyalty, etc.

A " content analysis " of how certain regions try to attract new firms reveals appeals like those launched by the Iowa Development Commission, which contained, *inter alia*, phrases such as " the care and feeding of executives is a fine art in Iowa " or " You'll make just as much money . . . and live longer . . . in Iowa "; a new contribution to the theory of the location of industry.

The authors repeatedly stress one point: satisfactions are the results of

achieving group-held values. It depends on the " reference group "—that is the group with which one identifies oneself—what needs, wants and motives determine one's actions. An individual may belong to several " reference groups," and from them may derive conflicting motives and values.

The reference group is to provide a key to economic behaviour. An American study of ownership of television sets undertaken in 1952 is quoted as having found no strong correlation of TV ownership with income-groups but with reference groups—those with and without graduate training. At a time when a given income range no longer reflects a relatively homogeneous social group—when incomes of middle class and working-class families overlap—a given level of income can no longer be associated with any particular pattern of spending and saving; the social psychologist's offer of additional information may, therefore, prove useful to the economist.

It is possible that economists and social psychologists will move away from each other and fruitful communication may become impossible. To have made a practical attempt at *rapprochement*, at constructing a bridge between two disciplines, is the great merit of this book.

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Economics and Liberalism. Collected Papers. By O. H. TAYLOR. (Cambridge, Mass.: Harvard University Press (London: Geoffrey Cumberlege), 1955. Pp. 321. 40*s*.)

FEW liberal economists are consciously consumed by the need for a total explanation of the universe. Whatever may be their unconscious desires for a unity of knowledge, they proceed as their predecessors have done for a century, seeking solutions to problems narrowly defined in their subject matter. It has not always been so. But the urge to construct an analogue to the physical sciences led, in the very heyday of liberal economics, to a close prescription of its methods and limits. The liberal economist might agree with von Thunen's quotation from Madame de Stael that " In the tops of the trees all sciences come together," but would insist that such was not his proper abode. Hardened creature that he was, he could eschew the yearnings of other men for both social and intellectual unity. He placed his competitive individualism against the social cosiness of the idealists, and his method of abstraction against the intellectual cosiness of those who sought to prove that all truth was one. It was an attitude appropriate to a lusty confidence.

To-day much has changed. Liberal economics is abandoning its splendid isolation. The psychologists, sociologists and anthropologists insist upon being heard. The total effect on outlook is an idealism at least reminiscent of the plea of T. H. Green in mid-Victorian England for a " positive freedom " in which the state should actively promote fullness of life. But the reassertion of the need for intellectual unity has been slower in making its appearance.

Now, from within the community of liberal economists comes a volume from one whose life preoccupation has in fact lain precisely here. For this reason Professor Taylor's book is of great interest. He askes: what in fact are the starting points of economic thinking; can we attain to a unity of knowledge? Some will feel that he has left many secondary questions unanswered, and left the primary one in equivocal condition. But his search for wisdom about matters customarily assumed is what matters.

Professor Taylor has been taking the long view for a long time; in fact, since he was a pupil of Taussig and Allyn Young thirty years ago. His book is not, as the primary title might suggest, a treatise, but something almost antithetical. It consists of his published writings as they appeared in the journals, together with an introduction giving his intellectual background and explaining the genesis of each piece. Few authors could stand up to this treatment, especially when, as Professor Taylor points out, there are collisions between the ideas set forth. But here is a sensitive, conscientious mind, preoccupied through a hectic generation with a single set of fundamental problems. We begin with the eager Ph.D. candidate, with his tendency to oversharpen distinctions, producing two excellent articles from his thesis on the eighteenth-century concepts of natural law. The search for unity and harmony, thus well begun, was never to be abandoned. But the young teacher was assailed, with his generation, by the depression of the thirties, the New Deal with its challenge to "do something," and the problems of power in a contracting economy. Then follow ten years of gestation after 1935, as he sought once more to unify the knowledge on which economists unwittingly depend, seeking to synthesise all major philosophical, social, economic, moral and political thought; an effort which has not, as yet, produced a "great book," but has yielded a powerful condensed conspectus. Finally, comes the attempt to apply his learning to post-war problems of education, the trend toward security-mindedness, the problems of freedom, and the future of economic liberalism. It is a fascinating, honest and graceful piece of intellectual history.

Liberalism, for Professor Taylor, "by its nature involves or requires and carries with it a philosophy of all existence, history, and science." An economist must rest his thinking upon a unified and structured view of the whole of human experience. He is not only not entitled to take over such a view without scrutiny; he must accept the duty of continuous re-examination.

This is a tall order. Moreover, it involves what appears to be an irreducible dilemma. How are we to reconcile the liberal's duty of continuous re-examination with the belief in such a synthesis? For, once discovered, it would, as in the past, itself become a dogma. The problem of education dramatises the difficulty. If liberal education means a comprehensive grasp of all leading aspects of human thought, we need a new Aristotle or Aquinas to provide a new unity so that it may serve as a basis of selection. But could the inquiring mind as conceived by the liberal survive in such an atmosphere?

There is a further perplexity. Professor Taylor has come to the conclusion that there are serious limitations to the power of reason to produce

such a cosmic synthesis, bringing together ultimate values and practical decisions. Faith is required. But what is its nature? Is it a sort of rationalists' residual—something to fall back upon when reason is exhausted; is it the psychologist's concept of intuitive intellect which operates passively or jumps by intuition to the essence of things; does it derive from some atavistic or unconscious will to believe in unity? With faith thus relied upon, how is the problem of communication to be solved—how can a man or a society convey a point of view to a second party; how can the traditional hope of the rationalist be met—that by reason men can be led to mutual understanding and sympathy? An explicit statement of the problem of faith in economics could hardly fail to be illuminating.

Professor Taylor's search for universal intellectual coherence on a liberal basis is a fascinating spectacle. For others such a synthesis may be available. For the liberal it must be eternally receding—an inspiration to thought always to be striven for, but never attained, and therefore, in itself no guide to action. But the struggle toward it may well illuminate policy. The author in fact has much to say about problems of action, and though specific prescription is rare, the exercise of practical perspective and judgement permeates his book.

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Philosophy, Politics and Society. A Collection edited by PETER LASLETT. (Oxford: Basil Blackwell, 1956. Pp. xvi + 184. 18*s*.)

WHY has this age no political philosophers of the stature of Hobbes or Locke, Mill or Marx? Accepting it as generally true that " for the moment, anyway, political philosophy is dead," Mr. Laslett addresses himself to the question " Who killed Cock Robin? " and compiles ten articles, mainly from learned journals, to illustrate what has taken its place. They indeed provide strong evidence for the prosecution of the Logical Positivists and, to a minor degree, the sociologists: for apart from Professor Michael Oakeshott's inaugural lecture at the London School of Economics on " Political Education," and Mr. Laslett's own contribution on " The Face to Face Society," they ponder not the broad issues and themes of political philosophy but offer instead only technical analyses of terms and concepts. Mr. T. D. Weldon's bleak and dispiriting conception of political theory is restated more concisely, and therefore even less plausibly, than it was stated in his *The Vocabulary of Politics*. Professor Gallie's consideration of liberal and socialist moralities falls into the common error of moral philosophers, of endowing everyday political demands, based on avowed sectional interest, with an ethical aura that they entirely lack either in the minds of the people making them or in the process by which they are met in actual politics. These opposite extremes, of shying away from all value judgments or of endowing ordinary political trends with secret value judgments, are characteristic of most of these articles.

At least three broad considerations modify the impression of modern

political thinking as it is here presented. First, even the traditional forms of political theory are not so entirely absent to-day as this collection implies. The works of Lord Lindsay and Sir Ernest Barker, of Mr. J. D. Mabbott (mentioned by Mr. Laslett) and Professor Laski stand in the central tradition. Secondly, if it be true that the Logical Positivists have withdrawn modern philosophy from its traditional relationship with political thinking and reduced both to verbal quibbles, whilst the sociologists have appropriated large territories formerly cultivated by political theory without making much use of them, it is even more significantly true that the economists have raced ahead of all other social scientists in making their own field of exploration a well-charted, fertile land. The rebirth of " political economy " which occurred during the inter-war years, with the decline in belief that economics were distinct from politics, helped to doom politics as a distinct subject for study. In a climate of opinion which gave economics primacy over politics and which coincided with a new technical mastery of economic principles, the emphasis of constructive thinking naturally shifted. Marx and Keynes should stand in Mr. Laslett's dock, alongside Ayer and Mannheim.

More important still, the traditions of political philosophy were disjointed by events: and not merely by the violence of twentieth-century politics, which meant, in Mr. Laslett's phrase, that " Faced with Hiroshima and Belsen, a man is unlikely to address himself to a neat and original theory of political obligation." Here, too, divergent pulls left something of a blank. In liberal democracy it became a habit to take more and more things " out of politics ": the constitutional monarchy, religion, the civil service, the police and the increasing number of highly important activities entrusted to " public corporations." Even differences between political parties narrowed with war-time coalitions, bipartisan policies, " Butskellism " and " Mendèsism." On the other hand, in the single-party states everything became political —police, administration, economic life, education, even culture. This totalitarianism killed political philosophy in an opposite way—by leaving it little to debate, smothering it in dogma and leadership principles.

This last trend, coming on top of the existing impoverishment of political philosophy, deprived political thinking of its former focus. Old-style politics were less important than they used to be, because the place where political activity occurred was now inside the party, the corporation, the trade union, the social institution, rather than between such bodies. Hence the limited value of the studies lavished upon electioneering procedures and statistics, the enhanced value of the study of political party organisations, of public administration, of trade-union structures. It may be only that political science is now engaged in the basic work that economists did a generation ago. If so, Mr. Laslett's collection will become not an inquest or even an obituary notice, but rather a Proustian *recherche du temps perdu*. Political theory awaits its Keynes.

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Private Credit and Public Debt. By A. MURAD. (Washington, D.C.: Public Affairs Press, 1954. Pp. 195. $3.75.)

THE scope of this book is a good deal wider than might be suggested by the title. Briefly, the argument is that there exists in capitalistic societies a chronic tendency for investment to decline and for the propensity to save to increase; public debt has to be issued in increasing amounts in an attempt to neutralise the deflationary effects of this, but the process must eventually lead to the collapse of the capitalistic system. In a word, the author is presenting another version of the well-known stagnation thesis, and, since this line of thought is already so familiar, the reviewer may be forgiven for concentrating on the new twists which the author gives to the argument. But it should be said that in general the book is well written and the ideas persuasively presented.

The first difference between this and most other versions of the stagnation thesis is that the author sets out to argue the entire case from first principles, beginning with the manner in which credit arises in the most simple acts of exchange and gradually building up the Keynesian theory of employment in language which would be understandable to someone previously innocent of economics. The reader already acquainted with Keynesian theory may find this rather tedious, since he will constantly be mentally translating the argument into more familiar language, but it may very well be that to the layman the author's approach would be refreshingly intelligible and coherent. The attempt to speak in plain language, plus a markedly partisan approach, unfortunately leads to a good many over-statements (the present-day capitalist is " someone who periodically clips coupons off the gilt-edged papers idly resting in his safe "; " socialism is engulfing the world " and so on), but except for this a very competent job is done here.

So far as the underlying monetary theory is concerned, the book is less impressive. Language apart, the argument is a familiar one, and the author's attempts to stake a claim of originality unquestionably lead him into error. For example, what is in all important respects the Keynesian theory of the rate of interest is presented; yet the author is at some pains to deny this fact, and the grounds on which he does so (pp. 92–3) are not very strong. It is simply not true that the banks " are fully capable of providing the community with all the currency it wishes to hold," since apart from legal restrictions there are factors which tend to make the demand for liquidity infinite when interest rates are very low. Nor does it follow that because human beings find it pleasant to receive an income without working they will invariably prefer securities to cash, as the author argues. Securities carry a risk of capital loss as well as a promise of income, and it is precisely because of this that the speculative demand for cash exists.

A more basic weakness arises from the author's identification of saving with a desire to obtain unearned income. The latter may often be the motive for the former, but the two are in no sense synonymous. Professor Murad states correctly that the " result of the community's desire to save

more than is being invested is to deprive itself of income and employment" (p. 125), but because he identifies saving with the desire to purchase securities he is driven to equate this excess propensity to save with a "thirst for securities," and confusion results. The author seems to lose sight of the fact that deflation occurs not because people buy securities but because they do not buy goods; the two things are not at all the same. The U.S. Government increased its debt in the 1930s not "to enable people to hold securities" (p. 129) but to augment effective demand without needing to simultaneously reduce it through extra taxation. It is the government *expenditure* which does the trick, not the increased public debt, which may or may not be the by-product; by stressing the debt rather than the expenditure, the author puts the cart before the horse throughout, and fatally weakens his case thereby.

A third new twist to the argument is the exposition of what is called "the principle of diminishing net investment." The assertion here is that investment results in the construction of new plants, and that as new plants are finished more labour must be drawn from the capital-good industries in order to operate and maintain them. Ultimately there will be so many plants that the entire labour force will be needed to operate them; no labour will be left to construct additional plant, and hence net investment will cease. The fallacy here, of course, is that it is implicitly assumed that all investment consists of capital-widening and not capital-deepening; it is common knowledge, surely, that in practice investment frequently results in a reduction rather than an increase of the operational labour force.

As to the rest, the familiar stagnationist arguments are presented, albeit very competently—falling marginal propensity to consume, capital-saving inventions (atomic-power plants being included in this category, curiously enough), declining rate of population growth and so on. How impressed one is by all these points seems to be primarily a matter of temperament; for myself, I suspect that the position most of us take up in this rather dog-eared debate nowadays is decided more by faith than good works.

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Housing Taxation. By W. A. MORTON. (Madison, Wisconsin: University of Wisconsin Press, 1955. Pp. 262. $4.75.)

THIS book is an attempt to deal with a problem which is of great importance to all those concerned with either housing problems or the finance of local government. Both in the United States and in Great Britain the fundamental problem of local finance is that of providing local authorities with a revenue which will expand with their expanding liabilities for municipal and social services. Subventions from State or Federal Government in the United States, or from the central government in Great Britain, imply at least some loss of independence and with it some of the local interest in local government. In the United States the chief source of local revenue is

the local tax on real property, similar in many ways to local rates in this country. It is commonly regarded as a bad tax, but as long as it was sufficiently low to constitute no serious burden, its alleged defects could be overlooked. By 1945, however, the total yield from the local property taxes was equivalent to 8·85% of all Federal, State and local taxes in the United States, and according to Mr. Morton's calculations was frequently as much as 25% of the annual cost of accommodation.

In *Housing Taxation* Mr. Morton tries to assess the validity of the criticisms of the property tax, and also to compare its effects with those of a local sales tax, which is often regarded as the only practicable alternative. The first six chapters are concerned with the effects of the property tax on housing. These are painstaking perhaps rather than analytically penetrating. Mr. Morton has no difficulty in demonstrating from published statistics the familiar fact that although annual expenditure on accommodation tends to increase absolutely with income, it does not increase so fast. Thus families in the higher-income groups tend to spend a smaller proportion of income on buying accommodation than those in lower-income groups. It follows, *ceteris paribus*, that a tax that is proportional to the annual value of accommodation, such as the property tax, tends to be regressive with income. Mr. Morton seems to consider, however, that the necessary condition is that the incidence is wholely on the occupier, except in so far as it has been capitalised in the value of sites. This, of course, is not so. The condition to be satisfied is less rigorous: that the proportionate divisions of the incidence of the tax between original site owner, building owner and occupier should, if not uniform for all dwellings, be such as not to offset the regressiveness of the nominal tax payment/income series. Although Mr. Morton discusses at some length the general theory of incidence of property tax, he does not investigate this question of variability; thus his analysis is of little use to him when he comes to evaluate the interesting statistical data he has collected later in the book. This is all the more unfortunate, as he might have been able to reach valid conclusions with regard to incidence with respect to sub-standard housing and/or occupiers with sub-standard income compared with the rest. Nevertheless this is the question in which he is particularly interested.

The result of analytical weaknesses in the earlier chapters is a lack of cohesion between them and the later chapters, for this earlier analysis provides Mr. Morton with no means of interpreting his facts. He has collected some very interesting data on the relation between property tax actually paid and incomes declared for income tax by owner-occupiers for a number of districts in the State of Wisconsin. He finds that actual percentage of income paid out in property tax increases to a marked extent as income decreases. Owing to the dead end into which his earlier analysis has led him, Mr. Morton is obliged to assume, in order to reach any general conclusions, that the extent to which all owner-occupiers took property tax into account in the price which they paid for their houses was the same so that real and nominal incidence is similarly regressive. He also assumes that the

regressiveness of tax with income shown for owner-occupiers is typical also for all tenants. While the first assumption may be reasonably plausible, the second is just one of those things which requires investigation. On this basis he proceeds to compare the regressiveness of the property tax with that of a hypothetical sales tax which would yield the same revenue. It is impossible in a brief review to do justice to the problems raised by Mr. Morton's discussion of the sales tax. For the reasons just given, however, it does not appear to me that he has established an adequate basis for his comparison of incidence.

In short while Mr. Morton has provided some very interesting data about owner-occupiers, I do not feel that he has added much to our knowledge of the effects of property taxes, particularly with respect to tenants, or as to the comparative real incidence of property and sales taxes. While Mr. Morton has perhaps not succeeded in the task he set himself, there is a great deal of interesting information in the book and some penetrating comments on the house market and the cost of housing. The book as a whole demonstrates both the difficulty of the subject, and the necessity of applying a most rigorous analysis to the conditions of the house market before attempting to draw conclusions from statistical data.

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Henry George. By C. A. BARKER. (New York and London: Oxford University Press, 1955. Pp. vii + 696. 57*s.* 6*d.*)

THERE are nearly seven hundred pages of this massive biographical study; and a good many of them could have been omitted with advantage. This is not to say that Professor Barker has written a bad book: indeed, much of it is good and no part of it positively bad. Its defect is that it gives so great a mass of detail as to prevent anything from standing out with real clarity. Particularly, Professor Barker pays far too much attention to reviews of Henry George's writings by contemporary critics who had nothing of special interest to say about them; whereas he fails to render any clear account of what George himself did have to say even in his most famous book, *Progress and Poverty*.

As against this, Professor Barker does give a much better balanced account than most writers of George's general attitude and avoids the error, so often made, of treating him as if he had been almost exclusively the advocate of the Single Tax. Those very words, Single Tax, he points out, came into frequent use only at a quite late stage in Henry George's career and became the slogan of Henry Georgism less through any doing of George himself than through that of a particular group of his disciples, who stressed the purely fiscal aspects of his doctrine and were in many cases even opposed to him on other fundamental issues. George himself was never simply a Single Taxer; he put quite equal emphasis both on Free Trade as a matter of uni-

versal principle and on the need for public ownership and operation both of public-utility services in general and of other undertakings in which it was impossible to avoid monopoly. Indeed, all through his earlier career, right up to the final decade of his life, George stood for public ownership of the land and regarded the land nationalisers not as his opponents but as allies. Professor Barker brings out very well the extent to which George, despite his consistent hostility to Marxism, was the ally of the Socialists in his missionary tours in Great Britain and had a notable influence on the development of non-Marxian Socialism—above all, on Bernard Shaw and the early Fabians. George was, however, separated from these Socialists because he always refused to recognise that there was anything in common between the private appropriation of land rent and that of interest on capital; whereas the Fabians and other Socialists regarded both alike as unearned yields of private monopoly.

Henry George was essentially an anti-monopolist who saw as anti-social and contrary to the laws of God and nature all forms of income accruing to individuals either from land ownership or from the holding of positions of special economic privilege, such as the operation of monopolistic positions in railroad or other public-utility operations, or any form of tariff or similar protection. He held that, if these forms of privilege were done away with, the root cause of economic depressions would be removed and production would so increase as to solve the entire problem of poverty throughout the world and to ensure, through competition, a just distribution of the enlarged product. Holding this view, he was utterly opposed to Marxist conceptions of class-struggle between capitalists and workers and, while siding with the workers and recognising that they were foully oppressed, saw as their enemies not their employers but the landholding and other monopolist groups which lived at their and the community's expense.

Henry George was, in effect, what Americans used to call a " Populist " in his essential ideas, and perhaps most of all in his use of the conceptions of natural law and divine providence as foundations for his social doctrine. With these conceptions he made his onslaught on the orthodox economists, except the Physiocrats, to whom he appealed against them; and with these same conceptions he assailed Herbert Spencer and the Social Darwinians and emphasised both his agreements and his disagreements with Pope Leo XIII in his reply to *Rerum Novarum*. He even invoked the immortality of the soul in support of his social precepts; and, while stressing the dependence of political on economic forces in society, he continually attacked materialism and insisted on the need for approaching economic questions from the standpoint of Christian ethics. In his latter days he dissociated himself from Socialism mainly because of his hostility to Marxism and class-war: on Christian Socialism his influence was strong both in the United States and in Great Britain.

All these points Professor Barker brings out well and convincingly, though they tend to be obscured by the mass of detail about lectures, articles, minor private affairs and unimportant social contacts. This would be a

good book if it were re-written at half the length, with most of these details left out. It is particularly good in those parts which relate to George's dealings with the Irish problem and with the Irish Catholics in the United States.

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Ulster under Home Rule. Edited by THOMAS WILSON. (London: Oxford University Press, 1955. Pp. xxiv + 229. 21*s.*)

THE Government of Ireland Act, 1920 was more than an interesting, if partly abortive, piece of legislation. It was the closing of a door on a long period of struggle whose memory was distasteful. Henceforth Britain felt free to suppose that the Irish question had been settled, and generations have grown up in complete ignorance of the condition and government of the sister island. There are now a large number of Englishmen who do not know that the six counties of the north are part of the United Kingdom—a fact which I recently had quaintly confirmed by the receipt of a letter from an eminent Professor and Fellow of the Royal Society who wrote in the belief that Belfast was in the Republic of Ireland. There must be few who can any longer state the issues dividing north and south, or who know that the depression now banished from Jarrow and the Rhondda still hangs heavy over Derry and Strabane.

An academic study of the present political and economic realities of Northern Ireland is therefore a welcome thing. But the book has a further interest. Northern Ireland is an experiment in the decentralisation of government. It is not a very far-reaching experiment, since autonomy is contained on one side by the reservation of most taxing powers to the Imperial (the Westminster) Government, and on the other by a political philosophy which takes a pride in the imitation of Britain. But even limited autonomy has some striking advantages, exploited or potential, and it is possible that other parts of the United Kingdom might benefit from a greater freedom of local experiment. Again, Northern Ireland is a test of the operation of democracy without effective opposition, for the Unionist Party has always had a majority, and apparently will continue to do so for a long time to come. At Westminster that party is always allied to the Conservatives, but at home it has done such disconcerting things as pioneering the nationalisation of road transport (1935) and passing a whole series of equivalents to the Labour measures of the 1945 Parliament. Finally, in the Six Counties the religious divisions, which in England have become of little significance in an age of unbelief, still enter into every detail of life. There is no more important question to ask about a man than " Which foot does he dig with? "; whatever the answer, he will almost certainly have an active connection with a church, and his church membership will determine his

residence, his companions, the games he plays and the shops he uses. This is a fascinating field for a sociologist.

Dr. Wilson's book opens with a brief general survey by Sir David Lindsay Keir—a trifle partisan in tone, but it must be remembered that the whole book is written by real or adopted Ulstermen who believe in the British connection. It is no use expecting a judicious neutrality in a treatment of the economics and politics of Ireland, for there are no well-informed Irishmen who are neutral. Mr. J. M. Mogey sketches the history and social divisions of the province, and Professor F. H. Newark the development of its interesting constitution. Mr. J. E. Sayers on the political parties is excellent in his discussion of the Unionists, but, perhaps naturally, weaker in describing the complexities of the Nationalist opposition and the curious position of the Northern Ireland Labour Party.

The central chapters are by Professor K. S. Isles, Mr. N. Cuthbert and Dr. Wilson himself on the economic structure and position of the province. These chapters are solid and authoritative, perhaps a little too restrained in pointing out the lessons of Ulster's experience. The greatest industries are agriculture, organised for historical reasons as a kind of peasant farming which is not easy to improve; linen, which has suffered a long decline; and shipbuilding, an uncertain industry. The province adds to its structural difficulties the fact that it lives for the most part by sea-borne trade, and has to bear high transport costs on many imports and exports. Since in addition workers are increasingly demanding parity of wages with the rest of the United Kingdom, the prospects for industrial expansion are not hopeful, except at times when labour is hard to get at any price in Great Britain. Northern Ireland would not have got as far as it has along the way of recovery without the singular and concealed generosity of the financial relations of the Imperial with the Northern Ireland government. But these relations, as Dr. Wilson clearly shows, need fresh thought.

Dr. Wilson, in his concluding chapter, offers an appropriately Irish conclusion, that Home Rule can be tried with most confidence in those regions where the majority of the people do not particularly want it. It is to be hoped that, despite this limitation, some of his English readers will fall victim to the fascination of an Irish problem which may well disturb once more the debates of Westminster, and will give it further study.

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Studies of Overseas Supply. By H. D. HALL and C. C. WRIGLEY. (H.M.S.O. and Longmans, Green, 1956. Pp. xi + 537. 37*s.* 6*d.*)

THIS volume is complementary to *North American Supply*, previously published in the War Production Series of the Civil Histories of the Second World War. It is not only, or even mainly, concerned with filling in details; it is rather a series of connected essays on particular topics of importance.

The essays fall naturally, by subject and by authorship, into two groups, with a couple of odd ones to complete the volume. There is an opening sentence which might well have been written by Churchill: "The drawing by the Island on supply from the seven seas is the theme of this book."

One group of studies, by Mr. Wrigley, is on the main developments, chronologically, in procurement from the United States: cash purchases, lend-lease, allocation of munitions. These are well-written and objective comments on the main events, with a shrewd insight into their nature and import. At the very least they serve to let us take a second look, in sharper focus than was possible at the time, at some of the problems of Anglo-American co-operation.

There is the sad tale of failure to agree on standard equipment and on British needs for non-common stores and components. It was unfortunate that it was seldom found possible to send specimen equipment to the United States; for the Americans, even more than most, seeing was believing. Again, looking backwards, we conclude regretfully that it was not always our most successful munitions which were pushed for production in North America, for example, Stirling bombers, Typhoon fighters, Napier and Liberty engines. Against this, there is the success story of the way in which British-inspired modifications were incorporated in American equipment (as on Sherman tanks) and of how Anglo-American co-operation produced such winners as the Mustang fighter.

Mr. Wrigley quotes from the history of the Ministry of Munitions in the First World War to the effect that concentration of buying was "achieved with difficulty owing to the reluctance of Government departments and private buyers to give up their usual channels of supply" (p. 71). Exactly the same difficulty was met twenty-five years later, in the United States as elsewhere, and it would certainly be met again. It is generally thought that British cash procurement petered out only because there were no dollars left. Mr. Wrigley maintains, with some justification, that "even if funds had been inexhaustible the system could not have continued very much longer, if its larger objectives were to be attained" (p. 112). The practical difficulties of placing contracts with suitable firms and of liaison with the United States Administration were so great that some joint project on the scale of lend-lease was inevitable.

The other group of studies, by Mr. Hall, is concerned with the Combined Boards and with the organisation of the British Missions in North America. These are good when Mr. Hall writes of the supply of raw materials, and his study of the Combined Raw Materials Board (C.R.M.B.) is excellent. In other respects, however, he tends to become discursive and at times confusing. He does rather less than justice to the Combined Production and Resources Board (C.P.R.B.). Admittedly, C.P.R.B. failed to follow up the grand conception of global planning of war production, largely because the American Services refused to play; but it turned with considerable success to the problems of non-military supplies, as evidenced by the experience of the committees (as on tyres and on textiles) set up in this field. Neither is

Mr. Hall very clear on the part played by Canada in the various types of combined action in Washington. The Canadian–American joint committees, set up in 1941 following the Ogdensburg and Hyde Park Agreements, were very active and conditioned the relations of Canada with the Combined Boards. They make only scattered appearances in Mr. Hall's text; even the names of the committees are confused, and the index is of little help in locating references. Some of Mr. Hall's comments, as on the "two-man pattern" of Combined Boards, seem to ignore the fact that Canada was a *member* of C.P.R.B. (from November 1942) and later of the Combined Food Board as well.

The two odd chapters are one (contributed by Mr. J. D. Scott) on scientific co-operation—with emphasis on such "fruits" of collaboration as radar, jet engines and atomic bombs—and one on war supplies from the Eastern Hemisphere. It is good to find some space devoted to the problems of war production in Australia, India and others in the Eastern Group. Though they never contributed more than 2% to total British supplies of munitions, these countries did make important contributions, for example, of rifles and small arms ammunition, at critical times and places.

The authors are always interesting and often very instructive in what they say about British forms of organisation in a foreign climate and in relation to the American forms. The gap between military and civilian groups on both sides was evident. It seemed to be easier for British and American civilians to get together (and similarly for the Services) than it was for the civilians and military on either side. Mr. Wrigley has a delightful passage (p. 157) in which he describes C.P.R.B. as erected "over the chasm that divided the military and civilian production planners in the United States, and in defiance of the law of gravity, from the top downwards." One difficulty was to get decisions taken by Generals to stick down the line among the Colonels and Majors, "at a lower altitude, where the atmosphere was always more oppressive" (p. 191). There was no "deliberate wrecking," only "a fairly prevalent feeling that Lend-lease business was a somewhat unwelcome addition to the main task of strengthening America's defences and could properly be relegated to a secondary place" (p. 127).

Mr. Hall contrasts British and American attitudes to overseas representatives. "The authority and influence of an American official abroad tended to be in inverse proportion to the length of his absence from Washington"; so Combined Boards were set up in Washington where "the American representative . . . could keep his place in the competitive struggle of the Washington agencies" (p. 237). Then there is the British habit, in the face of a conflict of interests, of appointing a Minister of State as co-ordinator, a device long resisted but eventually used in Washington in the guise of a Resident Minister for Supply. The British organisation did succeed in making full use of outstanding personalities—not only Arthur Purvis but also Sir Frederick Phillips, "whose influence on the supply side . . . was to be second only to that of Purvis" (p. 326). The comment here might well have gone farther, for it was the personal decision of Phillips to attach his

small Treasury team to the British Supply Council rather than the Embassy (where there was already a Treasury representative) which did so much to bolster up the essential power of the Supply Council in Washington.

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The History of Unilever. By CHARLES WILSON. (London: Cassell, 1954. 2 vols. Pp. xx + 335, and 480. 45*s.* per set.)

THIS work, in two volumes, presents the history of the Unilever concern, which in recent years " bought and processed more than a third of the whole tonnage of oils and fats which find their way into world commerce, which traded in more places and in more products than any other concern in the world, which employed nearly a quarter of a million people, represented capital supplied by about 300,000 investors, and counted its customers not in thousands but in millions " (I, p. xviii). It is a fascinating story of important events and developments, and it is well and skilfully told by Mr. Wilson. The clarity and fluency of the writing are enviable; and the author has displayed much-needed skill in tracing and presenting, sometimes successively and sometimes in interweaving narrative, the activities and growth of Lever's in England and abroad, Jurgens' and Van der Bergh's in Holland and abroad and, to a lesser extent, Schicht's in Central Europe.

The history reaches, as it were, a series of climaxes in 1927–29. In 1927 the two Dutch firms merged, after almost two decades of uneasy collaboration punctuated by sharp disputes and almost always subject to tension. The Schicht and other Central European interests joined the group in 1928, and early in 1929 the leading Dutch independents, Hartog's, followed suit. Finally, in September 1929, this vast amalgamation joined forces with the Lever organisation, which by then had extended from soap-making into the manufacture of edible fats and oils, merchandise distribution and produce-buying in West Africa, plantation enterprise in the Belgian Congo and elsewhere, shipowning and oil-milling—and, one is tempted to add, justifiably, " et cetera."

Mr. Wilson takes the story of the unified concern up to 1949. But after 1929 the treatment is more meagre. The reader will find little, for example, on developments in West Africa, where Unilever, through the United Africa Company, has vast and influential interests. Thus the " cocoa hold-up " of 1937, an event with far-reaching repercussions, has only eight lines (II, p. 324), and general price policy, also of great significance, is dealt with rather summarily in two paragraphs which confuse two separate points (II, pp. 322–3).

The first volume deals almost exclusively with the life and achievements of William Hesketh Lever and with the history of the organisation he founded taken up to 1929. The story is testimony to the initiative, ambitions and courage of a great business pioneer. Both his achievements and his failures are dealt with, the narrative often illumined with the pithy contemporary

comments of Lever himself. A character-study of Lever is skilfully worked into the record of events. It is an outstanding performance by Mr. Wilson, who successfully conveys the impression of vigorous, courageous and sometimes fool-hardy entrepreneurship without lapsing into uncritical adulation.

The second volume deals mainly with the histories of the three Continental firms, and to that extent the narrative is more diffused. But Mr. Wilson succeeds very well in keeping the story going, even though, for the reasons he gives in his preface, he can tell us less of the working of the minds of the principal actors.

The work contains a wealth of material on a wide range of subjects, such as the working of competition in different types of market, the forces making for or hindering mergers and amalgamations, organisation of large-scale enterprise, the rise of professional managers, the role of the banks in industrial growth, location of industry, industrial relations and the structure of the distributive trades. It is inevitable that on some issues the reader would like to have rather more detail or explanation, though readers will probably differ in their requests for supplementary material. In general, this is not a criticism of Mr. Wilson, for it would have enlarged the work unreasonably if he had tried to cater for the more specialised needs of particular groups of readers. But in some cases important topics receive scanty treatment. Thus a more detailed account of how Lever wooed and won the retail trade in England in the first twenty years of Sunlight soap would have been helpful. Mr. Wilson recognises the importance of this point, but has virtually nothing on it. This contrasts markedly with the treatment of the problem of introducing and distributing margarine. This is much fuller, though even here further elucidation might have enabled the reader to reconcile statements on branding and fixed retail prices (II, p. 70) and on the advantages of ownership interests by manufacturers in retail outlets (II, p. 92) with accounts of specific developments and events which do not seem to bear them out. Again, the impact of technological change on industrial structure is frequently mentioned, but there is too little detail to be convincing. For example, it is not explained how " technological development had made it necessary to regard the oil industry as one link in the total process of converting oleaginous materials into manufactured products rather than as the separate industrial process which it once had been " (II, p. 200). The precise meaning of this is not clear, and the process of vertical integration could, it seems, be explained in terms of the self-generating forces of an oligopoly market structure.

The emergence in 1929 of the Unilever colossus, the product of the merger of several smaller business giants, naturally provokes the question whether this sort of development is " desirable." In a brief epilogue of ten pages Mr. Wilson addresses himself to this question, among others—the historian, however tentatively, turns to questions of public policy. His comments, though of interest, do not always take the argument very far, and he does not go very deeply into the relevant issues. Thus he makes the point that active competition still remains. But it would be relevant to note that,

though history need not repeat itself, the story of the industry shows that competition between giants has been unstable in the past. Moreover, as history shows, there are all kinds of competition, and the question of public policy is which kind of competition is best. The issues and alternatives are not so simple as they are presented in the epilogue. The consumer, it is also said, "got the guarantees of consistent quality at prices that reflected the economies and the costs of large-scale production" (II, p. 393). The question, however, is whether the present high degree of concentration is necessary for guaranteeing quality or securing the economies of scale. It is obviously unnecessary for the former, and no evidence is advanced on the latter point.

It would give a wrong impression to end on this note of criticism, which refers to only a few pages which deal with issues going far beyond the Unilever story. This story was well worth telling, and Mr. Wilson has told it admirably. And he is surely right in stressing the great positive contributions made by a small number of enterprising pioneers and the feats of organisation accomplished by those who took over, consolidated and expanded the large firms which had been created at breath-taking speed. It is to be hoped that the initiative of Unilever's in making this study possible will encourage other firms to follow their lead. It would also be of great value and interest to economic historians and economists if Unilever's would find it possible to have more specialised monographs prepared on several of the many topics which Mr. Wilson could only touch upon, rather tantalisingly, in the broader treatment appropriate to the general history.

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NOTES AND MEMORANDA

FACTOR SHARES AND THE SAVINGS FUNCTION

1. A RECENT article [1] in this JOURNAL by the late Richard Brumberg presented a very interesting savings function, which was used with some success to give a "conditional prediction" of savings in the United States during and immediately after the Second World War. This short note gives a simplification of Brumberg's function which registers a very slight gain in predictive power over the same period but whose main merit is to economise on the theoretical artillery and the data collection and processing required for this model. A slightly different test of predictive power is also given under which both Brumberg's original function and its simplification do not stand up quite so well, although they are still much better than the alternative formulations that he mentions.

2. Brumberg's macro-savings function is derived by aggregation from a rather elaborate micro-theory, which is set out at length in other papers by him and Modigliani. Its details need not concern us here, except to note that he does not treat non-property income and property income as one variable, as is usually the case. After some algebra and approximations, the aggregate savings function is specified as

$$\Delta S = b_0 + b_1 \Delta Y + b_2 \Delta R + b_3 S_{-1} + b_4 G \quad . \quad . \quad (1)$$

Here ΔS is the increase in savings during the year, where savings is altered from the usual definition of the national-income statisticians of the U.S. Department of Commerce by: (i) including net additions to stocks of consumers' durable goods during the year; (ii) using replacement cost instead of original cost depreciation on fixed assets; and (iii) adding net contributions to, plus earnings of, social-insurance funds. Thus ΔS is an attempt to get at the change in the total net worth of consumers, rather than changes in monetary assets only. This point will be returned to later.

ΔY and ΔR are non-property (*i.e.*, wage and salary) disposable income and property disposable income respectively. Since the factor division of *disposable* income is not yet given in the U.S. national-income accounts, Brumberg used the estimates of Miss Frane and Dr. Klein,[2] with some adjustments. Property income is increased by earnings of the social-insurance funds. S_{-1} is the level of (adjusted) savings in the preceding year,

[1] R. E. Brumberg, "An Approximation to the Aggregate Savings Function," ECONOMIC JOURNAL, Vol. LXVI, March 1956, pp. 66–72.

[2] L. Frane and L. R. Klein, "The Estimation of Disposable Income by Distributive Shares," *Review of Economics and Statistics*, Vol. XXXV, November 1953, pp. 333–7.

and G is an index of share prices, used to provide some index of capital gains, which the micro-theory says may have some influence on savings.

3. This equation was first estimated for the period 1930–49, which gave a good fit with sensible magnitudes and signs for the parameters. The only explanatory variables that were at all highly inter-correlated were ΔY and ΔR with $r = 0{\cdot}51$. Brumberg then re-estimated the equation for the period 1930–41 and found that the coefficient for G was not significant.[1] The role that G plays is in any case difficult to assess statistically. If it is left in either the original function or the simplified function it improves the fit a good deal for both sample periods, but does not substantially lower the errors of prediction. Moreover, in a prediction situation one would have either to forecast the level of share prices as an endogenous variable or to treat it as exogenous, which are both hazardous undertakings. For these reasons I feel inclined to drop capital gains as an explanatory variable, at least in so far as it is measured by an index of share prices.

With G out, the equation estimated by Brumberg [2] becomes

$$\underset{}{\Delta S} = \underset{(0{\cdot}16)}{0{\cdot}53\Delta Y} + \underset{(0{\cdot}34)}{0{\cdot}68\Delta R} - \underset{(0{\cdot}10)}{0{\cdot}14S} \qquad R^2 = 0{\cdot}906 \quad . \quad . \quad (2)$$

This may be rewritten as

$$S = 0{\cdot}53\Delta Y + 0{\cdot}68\Delta R + 0{\cdot}86S_{-1} \quad . \quad . \quad . \quad (3)$$

Equation (3) is then used to give a " conditional prediction " of the level of savings for the years 1942–49. A " conditional prediction " means that all the variables on the right-hand side of (3) are assumed to be at their true level in the forecasted year concerned, and the value of S is then calculated. On this test (3) does quite well, or at least much better than the models that Brumberg uses for comparison.[3]

4. If one looks at (3) it will be noticed that the coefficients of ΔY and ΔR are not markedly different, and in fact the correlation between ΔY and ΔR for 1930–41 is 0·85. It was only during the War that the two com-

[1] A minor point to notice is that in Brumberg's equations (7) and (8) the constant term is in the wrong units for the data given in the appendix, as is the coefficient for G in (7) which should be $-0{\cdot}027$. For both the equations computed in this note the constant term was not significantly different from zero.

[2] Internal evidence suggests that Brumberg estimated the equations from data a little more detailed than that given in his appendix. Since the simplified function given in the text has had to be calculated from these data, the original equation has been recomputed using these data also. This explains the discrepancies (which are not very great) between (2) and Brumberg's original equation (7). The standard errors are given in brackets. R^2 is the square of the multiple correlation coefficient, corrected for the degrees of freedom available.

[3] These are: (i) a " naïve model " that says that next year's saving will be the same as this year's, *i.e.*, $S_t = S_{t-1}$; (ii) another " naïve " model which says that the difference between next year's saving and this year's saving will be the same as the difference between this year's saving and last year's saving, *i.e.*, $\Delta S_t = \Delta S_{t-1}$; and (iii) the saving function due independently to Modigliani and Duesenberry, where *per capita* real saving depends on current *per capita* real income and the highest level of income reached in earlier years. Brumberg fits (iii) to unadjusted Department of Commerce data.

ponents of income moved in opposite directions. It seems natural therefore simply to amalgamate ΔY and ΔR, *i.e.*, add together property and non-property disposable income to obtain just total personal disposable income. If such a device would work, it would mean a considerable saving in the large number of arbitrary decisions needed to divide disposable income into the factor shares. In fact, it *does* work for the sample period 1930–41 and provides a slightly better conditional prediction than (3). The estimated equation reads

$$\Delta S = \underset{(0\cdot04)}{0\cdot58}(\Delta Y + \Delta R) - \underset{(0\cdot07)}{0\cdot15}S_{-1} \qquad R^2 = 0\cdot938 \quad . \quad . \quad (4)$$

which is rewritten as

$$S = 0\cdot58(\Delta Y + \Delta R) + 0\cdot85S_{-1} \quad . \quad . \quad . \quad . \quad (5)$$

The two series of residuals generated by (3) and (5) are compared below, where it is seen that (5) is very slightly the better, though not uniformly so. All figures are in billions of 1939 dollars.

	Eqn. (3).	Eqn. (5).		Eqn. (3).	Eqn. (5).
1942 . .	3·7	3·5	1946 . .	−3·5	−2·9
1943 . .	3·2	2·9	1947 . .	−1·0	−1·0
1944 . .	2·8	2·8	1948 . .	0·4	0·6
1945 . .	−1·2	−1·0	1949 . .	−0·9	−1·0

The mean squared error for (3) is 5·9 and for (5) is 5·0.

5. The simpler specification does not work quite so well—though nearly so—for the sample period 1930–49, since ΔY and ΔR moved in different directions during the War. This suggests that it is only when one has a good reason for expecting markedly different movements in the two components of income that the division is worthwhile. Such differing movements are rather rare; the results of the 1930–41 sample show that the severe depression of the 1930s was not enough to produce them.

It is probable that these last remarks apply only to the United States and countries with comparable real income, where the consumption patterns of wage and salary earners are not greatly different from those of rentiers. In countries with lower levels of real income, consumption patterns are likely to differ widely between these factors, and the division of income will probably be important. Recent investigations by Professor Stone and others suggest that the United Kingdom belongs to this latter category, though gradually moving out of it.

6. The test of " conditional prediction " that has been used can be made more stringent by recognising that one of the explanatory variables in (3) and (5) is S_{-1}, which is a lagged endogenous variable. Accordingly, I propose a modified " conditional prediction " which replaces the true value of S_{-1} by the value estimated by equations (3) and (5). If one were in a prediction situation this is the problem that one would be faced with (making the brave assumption that the rest of the model forecasts exactly at time t

even if incorrect forecasts are made of S_{t-1}).[1] Using this test we get the following series of residuals:

	Eqn. (3).	Eqn. (5).		Eqn. (3).	Eqn. (5).
1942 . .	3·7	3·5	1946 . .	1·5	1·9
1943 . .	6·4	5·9	1947 . .	0·3	0·5
1944 . .	8·3	7·8	1948 . .	0·7	1·0
1945 . .	5·9	5·6	1949 . .	−0·3	−0·1

The mean squared error of (3) is 20·2 and of (5) is 18·0.

Again (5) does very slightly better than (3), though not uniformly so. The errors are, of course, much larger than in the less stringent "conditional prediction," though it is interesting that in the latter part of the forecast period both equations do quite well, in fact rather better than if the true values of S_{-1} are used.[2]

7. Although I do not attach very great importance to the ability to forecast war-time levels of saving, it is interesting to inquire into the reasons why models of the Brumberg type should do so comparatively well. It has been shown that the division of income into factor shares is of little importance. This fact has implications for Brumberg's micro-theory which will not be examined here; in any case, the objection is probably only valid for advanced economies. The addition of lagged savings is certainly a help, in the sense that one gets considerably worse conditional predictions without it.

The most important reason[3] would seem to be the addition to net monetary savings of net investment in consumer durable goods. Monetary savings and expenditure on durable goods are probably rather strong substitutes at the margin, and their total shows greater stability than either taken separately. The variable that is estimated, *i.e.*, net additions to consumers' total assets, is one of undoubted economic meaning and importance. It is not a strategic variable for business cycle analysis however: for such analysis it is the form which this net accretion of assets takes that is crucial. In buying consumer durables, the consumer is making his own net investment. By accumulating monetary assets he is providing funds with which other people may implement investment decisions; and these funds may not be spent.

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[1] One has also to make the further assumption that S_{-1} does not appear as an explanatory variable anywhere else in the model.

[2] The naïve models provided by Brumberg are quite hopeless under this more stringent test. Naïve model (i) never gets away from the 1941 value, and naïve model (ii) gives a constant change of +6·4. Of the two, naïve model (ii) is by far the worst. Model (iii) is not affected by this test, since lagged savings is not one of the explanatory variables. Its error is still very large, however; the mean squared error is 161·6.

[3] It is probable that the use of replacement-cost depreciation rather than original-cost depreciation also helps, although I would judge its effect to be minor compared with that of treating monetary savings and net investment in consumer durables as one variable.

YET ANOTHER NOTE ON FOREIGN EXCHANGE RATES AND MONOPOLISTIC COMPETITION

In the June 1953 issue of this Journal I examined very briefly what I thought at that time to be a few typical partial equilibria of a British exporter and a British importer before and after devaluation. In the same issue my examination of the price-competition case of British exports was criticised by Mr. Harrod, and in the March 1956 issue of this Journal Mr. Spraos adds further criticism. A short reply would not, perhaps, be entirely out of place.

I had assumed the British share of the United States market to be a small one, and in most industries this assumption seems sound enough. But I had also assumed, implicitly at least, that the British exporter was either alone in the United States market, competing with United States producers or with exporters from non-devaluing third countries. Or, if he was not alone, the British exporter would at least be part of a group of British exporters having an outspoken *esprit de corps*. In his comment to my paper, Mr. Harrod informs us that such *esprit* is frequently lacking. This information I took *ad notam*. Many of us in this country are biased, as Mr. Harrod puts it, "to assume that competition in Britain is moribund." I am sure we have profited from his reminder.

In his recent note, Mr. Spraos adds a criticism for which he claims logical precedence over Mr. Harrod's in the sense that it would hold even if the British export firm were small and were entirely alone among its United States competitors. The criticism is that my equality between marginal cost and marginal revenue *obtained from the foreign market* will normally imply price discrimination between the foreign and the domestic market, and Mr. Spraos cannot believe that such discrimination is widely practised. If in the absence of such discrimination the American demand elasticity would be low and the home demand elasticity would be high, both being measured in the neighbourhood of the common price, then a devaluation of the pound would reduce the dollar earnings of the British exporter. True, it would be tempting to discriminate by raising the foreign price and reducing the domestic price to the points where the marginal revenues in the two markets were equal; this would raise the foreign price up to a point where foreign demand would be elastic. But Mr. Spraos makes the surprising statement that nothing less than the shield of a statutory export monopoly is adequate for the maintenance of such an export premium. What he must have had in mind here is pure, not monopolistic competition.

I plead absolutely guilty of having assumed that marginal cost equals marginal revenue obtained from the foreign market. Is this tantamount to price discrimination? Whether it is or not is a matter of semantics. I was thinking of monopolistic competition, compare my title. For years American missions to Western Europe and American hosts to Western European productivity teams have been preaching that in the United States goods are sold a different way. Higher selling costs are involved, and less

price resistance can be expected at the consumer level. To the extent the British exporters heed the American advice and engage in aggressive, high-price selling, are they discriminating? (Here is where my analysis of the non-price competition case, pp. 291–3, not commented upon by my critics, should be quite realistic.) Why should they not be discriminating? The more highly differentiated the products, the less need for a statutory export monopoly. *Differentiation itself is a shield.* The United States port-of-entry retail price of a British MG-A is $2,195. The United Kingdom list price of the same vehicle is £595. I do not know whether these prices are discriminatory or not, but I do not see anything which would make it impossible for them to be so. Unauthorised American dealers might well find it impossible to obtain delivery for sale in districts already having an authorised dealership. Without authorisation, without stocks of spare parts, they might not even be able to sell successfully at the retail level, anyway. Few Americans would pick up their MG's in Britain and ship them over. And substitutes for the MG-A are few and far between. The Austin-Healey is produced by the same company as the MG, and can hardly be expected to pull the carpet from under the latter. The Jaguar XK-140 sells in a price bracket twice as high; and its price, too, may have been adjusted to the United States kind of market. In short: the shield seems to be there even in the absence of a statutory export monopoly.

Quite a different matter is that the shield may not be exploited. In fact, Mr. Harrod's report on his experience with British manufacturers reveals their marked disinclination to soak foreign markets. Again, this is information to be taken *ad notam.*

When all this has been said and done, new and serious doubts could be raised about the usefulness of partial-equilibrium analysis as applied to the case of devaluation. The macro-economic approach would seem more promising, but that is a different story.[1]

HANS BREMS

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COMMENT ON HANS BREMS' "STABILITY AND GROWTH"[2]

PROFESSOR HANS BREMS' conclusion in his article in the December 1955 issue of this JOURNAL that " the notion of an equilibrium rate of growth thus assumes new importance " because " the instability of a growth model of the Harrod–Domar type can be made to shade over into stability by simply lengthening the time unit on which investment planning is based . . ." leaves some lingering uncertainties in this reader's mind.

(1) Brems' interesting results seem to differ from the Harrod–Domar models not so much because of the time unit chosen as because of the shape

[1] To be further explored in the writer's forthcoming " Devaluation, A Marriage of the Elasticity and the Absorption Approaches " in this JOURNAL.

[2] ECONOMIC JOURNAL, December 1955.

of the assumed consumption function. If a linear consumption function with identical average and marginal propensities to save had been used, as in the Harrod–Domar models, then regardless of the time element in investment planning an unstable equilibrium would have resulted (analogous to Brems' Fig. 4).

(2) In Brems' model, stability is gained only in the special case of an investment planning period of approximately nine years or more—with a period any less than this, no stable equilibrium would be possible. Alternatively, a marginal propensity to consume of 0·75 (with a capital coefficient of 3) would require an investment planning period of about sixteen years to provide a stable solution, and a capital coefficient of 4 (with marginal propensity to consume remaining at 0·6) would necessitate a thirteen-year period for stable equilibrium. If, with realistic values for the capital coefficient and the marginal propensity to consume, an investment planning period of roughly nine to fifteen years is needed for stable growth, stability seems to have been gained only at the price of realism.

(3) More importantly, Brems appears to have shifted the shoe of stability on to another and less familiar foot, so that rigorous demands are put upon consumption rather than investment for the maintenance of stable growth. In the Harrod–Domar models, at any level of output there is only one level of investment which will be compatible with equilibrium growth (or, in Harrod's terminology, only one "actual" capital coefficient which will produce equilibrium growth, and that is one precisely equal to the "warranted" capital coefficient). Any divergence causes an explosive movement away from the current level of output. In Brems' model, however, investment demand from one period to the next is a stable function of the change of current net real national output, while the consumption function must make precise periodic shifts. These shifts must be such that the autonomous element in consumption grows at precisely the same rate as does the equilibrium net real national output.

This last condition, which Brems suggests "it is reasonable to assume," leads to two conclusions. First, if this in fact does occur, then the actual level of consumption at every equilibrium level of output will, if plotted, lie on a straight line passing through the origin of a familiar consumption-function diagram, so that the long-run consumption function is actually the same as the Harrod–Domar function.[1] Thus Brems' model appears to differ from its predecessors in that for the duration of each decade there is a mirage effect; that is, the consumption function temporarily appears flatter than it really is in the long-run.

Secondly, as regards the shift in the consumption function, if households should decide not to increase the autonomous element in consumption by the precise amount $[A(t) = (1 + g)A(t - 1)]$, then instability will result. If consumers constantly over-shoot the mark, explosive growth occurs; if they constantly under-shoot it, income falls toward zero over a number of

[1] For the sample values Brems gives in note 1, p. 622, the equilibrium level of consumption would always be 88·46% of national output.

decades.[1] If consumers have successfully over-shot the mark once, with its resulting increasing rate of growth, they are just as likely to remain overly-optimistic as are investors who have over-shot the mark profitably in the Harrod–Domar models.

If these conclusions can be drawn from the Brems' model, then stability is equally precarious, although consumers rather than investors are to blame. It is undoubtedly fruitful to build models based on secular shifts in the consumption function for a change (instead of fluctuating investment demand), but it would hardly seem fair to endorse Professor Brems' final conclusion that " unstable equilibria are rather uninteresting."

A. M. CARTTER

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A COMMENT ON MEEK'S "NOTES ON THE TRANSFORMATION PROBLEM"

I WOULD like to suggest that, in their handling of the " transformation problem," Bortkiewicz, Sweezy, Winternitz, Meek and others are introducing unnecessary complications, due to their pursuing a will-o'-the-wisp. Having obtained three equations with four unknowns (the second set of equations on p. 101 of Meek's article), they then look round for a fourth condition in order to make the problem determinate. But the problem *is* in the nature of reality, indeterminate. For x, y and z are not three different, independent variables. Only their ratios are significant, and need to be determined. Values and prices are quantities of different dimensions, measured in different units. Values are measured in quantities of labour-time. Prices are measured in terms of money. In each of the three different departments of production values are converted into prices by means of a multiplier x, y or z. Each multiplier implies a factor relating labour-time to money. The absolute value of this factor is of no significance. It does not matter whether an hour of labour-time corresponds to 1 franc, 10 francs or 100 francs. Only the *ratios* of x, y and z are relevant to the

[1] Any variation in the value of $y\left(\frac{A(t)}{Y(t)} = \frac{A(t-1)}{Y(t-1)} \ldots = y\right)$ from one period to the next makes the system unstable, just as any change in the savings propensity (without a corresponding adjustment in the capital coefficient) produces explosive growth or contraction in the Harrod model. If output has been growing at the equilibrium rate of 48% per decade, but beginning in period $t+1$ the autonomous element in consumption increases by only 36%, given the other parameters of the consumption and investment functions, stable growth at this new lower rate is impossible. The rates of growth in Brems' equation 3(b) and equation II (pp. 616 and 620) diverge (analogous to Harrod's " warranted " rate of growth exceeding the " actual " rate of growth) and output contracts. Diagramatically, in his Fig. VII, the consumption function in $t+1$ does not shift upward sufficiently to lie above the scale line at $Y(t)$. Alternatively, if $A(t+1)$ is 60% greater than $A(t)$, then g as determined by equation II is almost 125%, while g in equation 3(b) is only 60%, and growth occurs at a more than proportionate rate.

transformation problem. Given the ratios, the actual prices can be arrived at by the use of a *numéraire*, the magnitude of which is immaterial.

Thus there are really only three unknowns, the rate of profit and the two ratios $x : y : z$. These can be determined from the three equations. No fourth condition is needed.

The idea of equating the sum of the prices (or of any prices) to the sum of the values (or of any values) is nonsense. To equate a ratio of prices to a ratio of values might make sense.

H. D. DICKINSON

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OBITUARY

FEODORA STONE, 1909–56

FEODORA STONE, whose early death occurred, to the sorrow of all who knew and admired her, on June 28, 1956, had made a special place for herself in the evolution of economic research in the United Kingdom during the past fifteen years. As Secretary of the National Institute of Economic and Social Research she played, from 1939 onwards, a central and important part in the war-time and post-war expansion of research in applied economics. The Institute itself had been created through the energies of Lord Stamp, Sir Henry Clay, Sir Hubert Henderson and others in the years just before the war. When war broke out it already had a small and active staff, under the Directorship of Noel Hall. This was absorbed, lock, stock and barrel—into the Ministry of Economic Warfare at the outbreak of war, and the task of caretaking what remained of it was entrusted, under the general guidance of Geoffrey Crowther, to Feodora Leontinoff, as she then was, a young assistant lecturer in the Department of Philosophy at University College, London.

After the original premises in Gordon Square had been bombed, the headquarters of the National Institute (and there was precious little else) were given a temporary and very welcome refuge in Chatham House. From that unpromising beginning, under the inspiration of Henry Clay and Geoffrey Crowther, but more than anything through her abundant energies the National Institute was gradually re-animated. Research work was started again, with Laci Rostas, Herman Levy, Alexander Baykov, Phyllis Deane and others busily occupied. More of us who were in Whitehall offices enjoyed the opportunities of putting in a few hours work at something that smacked of the academic life. As a major task, Richard Stone started a project of national-income studies, designed to fill in and extend over the inter-war years the knowledge of the main components of national income that he was currently compiling in Whitehall. New premises were found in Westminster. Work started before the war was finished and published. Under Feodora's hand the Institute came back

to life. Another bomb in 1944 diminished its amenities, but could not break its newly found spirit.

She would never for one moment have claimed for herself that she was an economist. She had her own professional standards of competence in her own discipline, and was fully aware of her limitations outside it. But she carried into her work of organising economic research the consciousness of what ought to be the required standards of scholarship, accuracy and clarity of thought, and she was devastatingly critical—at least in private—of slip-shod work and of muddy thinking and writing. She could be intolerant and sometimes rightly intolerant—as well as the most devoted of friends. As secretary of an Institute that lives by eternally raising funds, she had all the qualities that make for success. She was interested in administration and prepared to take infinite trouble over detail. She had, without the need to learn by mistakes, the capacity to visualise the problems of the grant-giving Foundations and to present a case in a form that would both appeal to them and satisfy their necessary conditions. With them, she was patient and infinitely insistent. Above all, she could fill the overworked members of her Executive Committee with something of her own enthusiasm and extort work from them far beyond their own intentions to give it. She had an instinctive and wholly feminine understanding of when good food and pleasant surroundings would make the difference between success and failure.

She was born in New Zealand in 1909 of a family that came originally from Russia and more recently from England. They moved to the United States, and part of her education was in Los Angeles High School. She later made her own way to London and worked first as an undergraduate and later as a junior lecturer in University College. Her interests were varied. She read widely. She enjoyed modern painting. She loved travel and good food. She was never happier than in creating a beautiful and well-designed environment for work in the Institute and in finding the furniture and decorations which would make it worthy of her concept of it. She married in 1941 Richard Stone, whom she had come to know through his work at the Institute, and their daughter Caroline was born in 1945. She took the running of her home and her family in her stride and did it all with the skill and zest that we had come to expect of her.

But if there is one characteristic that one will specially remember, it is her loyalty to all that touched the Institute she had done so much to create. It was typical of Feodora Stone that, only a month before her death, and when already in hospital, she insisted on returning to the Institute for a critical meeting of its Executive Committee to see through to the end a plan for its financial strengthening that she had been helping to prepare. That gesture of indomitable courage and of devotion to the Institute will remain for some of us an enduring last memory of her.

AUSTIN ROBINSON

Sidney Sussex College,
Cambridge.

CURRENT TOPICS

THE International Economic Association held its first Congress in Rome at the beginning of September 1956. Each of the five days of sessions was devoted to one aspect of the general theme of Stability and Progress in the World Economy; a main address was followed by discussions, opened by two selected speakers. The five main addresses were given by Professor Sir Dennis Robertson, Professor Jacob Viner, Professor François Perroux, Professor Gottfried Haberler and Professor Erik Lundberg. Each of them in his own and very distinct way provided something that will long remain in the memories of those privileged to hear it. The Congress was attended by nearly five hundred economists, representing almost every country in the world. For its success and the admirable arrangements made for it in the University of Rome, the greatest thanks are due to the Rector of the University, Professor Ugo Papi, himself one of the most distinguished of Italian economists. The discussions, translated simultaneously into English and French, were lively and protracted. Messrs. Macmillan will be publishing a volume containing the papers and the contributions of the discussion openers, together with a summary of the subsequent discussions. On the Sunday which fell in the middle of the Congress a large number were received in private audience by His Holiness the Pope, who delivered to them an address which it is hoped to include in the volume. At a meeting of the Council of the Association, Professor Erik Lindahl was elected President for the next three years in succession to Professor Howard Ellis; Professor Louis Baudin was elected Vice-President. Professor Austin Robinson was re-elected as Treasurer. At the same time Sir Dennis Robertson and Professor Albert Aftalion were made Honorary Presidents of the Association.

WE record with great regret the sudden death of Mr. A. A. Adams at the early age of thirty-four. For eight years he had held a research post at the Department of Applied Economics, Cambridge, where he had acquired a unique reputation by his capacity for clear and original thinking and his inexhaustible patience and thoroughness in seeing complex statistical jobs through to the end. For the last three years he had also been statistician to the London and Cambridge Economic Service, and his overhaul of the basic statistical tables in their *Bulletin* put users heavily in his debt. His work as an economic statistician was largely on estimates of the national product in real terms and related matters, on which he wrote many articles for the *London and Cambridge Economic Bulletin*. Immediately before his death he was in the middle of an article giving quarterly figures for the total supply and disposal of goods and services in the United Kingdom; fortunately (and typically) his papers were in sufficiently good order for this to be completed, and this pioneer work stands as the climax of his long fight against difficulties—including the paralysis which followed from an attack

of poliomyelitis when he was eighteen. We extend our deepest sympathy to his widow and two children, the younger of whom was born two days after his death.

Houblon-Norman Awards. The Trustees of the Houblon-Norman Fund invite applications for Fellowships or Grants in aid of Research into the working of industry and finance in Great Britain and elsewhere and the economic conditions affecting them. Fellowships, which are intended for experienced research workers, are awarded for full-time research for one year, which may be renewed for a second year. Grants are awarded for either full-time or part-time work. The amount of the awards, which will take effect from the October 1, 1957, will depend upon the circumstances of the candidate and the probable expenses of his work. Candidates must be British subjects normally resident in the United Kingdom. Forms of application, which may be obtained from the Secretary of the Fund, c/o the Bank of England, London, E.C.2, should be returned not later than March 1.

The Trustees, on the recommendation of their Advisory Committee, have made the following awards for 1956/57:

Research Grants

Mr. J. D. Bailey, Graduate Student, University of Oxford.	British Investment in Australasian Financial Companies, 1870–1900.
Mrs. C. R. Fulop, Lecturer. (Renewal.)	Buying Practices of Retailers.
Mr. J. K. Horsefield.	Investigation into the connection between the Land-Bank Schemes of 1690–1720, the development of banking theory, and particularly the Recoinage of 1696.
Mr. J. Jewkes, Professor of Economic Organisation, University of Oxford.	Inventions and the Development of Inventions in the Aircraft Industry, 1900–1950.
Mr. R. V. Lennard, Historian. (Renewal.)	Rural England in the Feudal Age.
Miss C. A. P. Leubuscher.	Shipping Facilities available to the Overseas Trade of Colonial Territories.
Mr. A. L. Minkes, Tutor, Department of Extra-Mural Studies, University of Birmingham. (Renewal.)	The Economic Structure of the British Paint and Varnish Industry.
Miss J. E. Mitchell, Lecturer, University of Nottingham.	The Balance of Payments Crisis of 1951.
Mrs. C. S. Orwin	English Farming, 1846–1913.
Mr. R. A. C. Parker, Lecturer, University of Manchester. (Renewal.)	18th and Early 19th Century Landed Estates.
Mr. H. W. Parris, W.E.A. Tutor, Northamptonshire. (Renewal.)	Board of Trade Railway Department and its influence on the Development of the Railway System in Great Britain.
Mr. A. J. Youngson, Fellow of Emmanuel College, Cambridge.	Comparative Study of Economic Development.

THE following have been admitted to Life Fellowship of the Society:

Agarwala, J. S.	Dufty, N. F.	Mitra, A.
Druiff, P. D. J.	Fels, E. M.	

THE following have been admitted to Fellowship of the Society:

Abou-Hindia, M. E.
Agyemang, T. K. O.
Anupke, W. J.
Asare, K. A.
Azam, K. M.
Barton, W.
Beckington, K. G.
Belok, F. C.
Bhatt, A. S.
Bhatt, D. P.
Bishop, G. C.
Bixley, B. D.
Brahmanandan, J.
Brown, S. A.
Chapman, A. E.
Chakravarty, G. C.
Chowdhury, M.
Clark, D. A.
Consin, J. O.
Constantinides, C. E.
Corina, J. G.
Cukelu, E. N.
Dangi, S. P. S.
Desai, N. R.
Djanie, S. K.
Duncan, H. L.
Forman, R.
Ghosh, Dr. A. K.
Graham, Mrs. A.
Gupta, D. K.
Harboort, J.
Hayford, S. A.
Heath, K. L.
Hershlag, Dr. Z. Y.
Joaquim, L. A.
John, P. D.
Johnson, G. B.
Kaysen, C.
Kessler, S.
Kolo, S.
Levin, H. J.
Liesner, H. H.
Lindley, W. B.
Lokapur, P. S.
Lorente, D. J.
Mankhand, L. C.
Mathur, S. M.
Maxcy, G. E.
Nabers, Prof. L.
Nallusamy, A.
Neagus, R. H.
Olleson, J. D. S.
Onuora, G. I.
Ozbekhan, H.
Pitchai Thamby, M. K. M.
Quli, S. Z.
Rama Rao, K. S.
Rathnam, T. V.
Rechter, I.
Rubner-Raviv, A.
Samy, A. H. A.
Sen-Gupta, N. M.
Shah, R. R.
Shonibare, M. O.
Siddiqi, A. A.
Somwaru, J. P.
Soper, T. P.
Taiwo, B. B.
Talwar, S. R.
Tan, D.
Tether, C. A.
Thompson, R. H.
Topping, S. G.
Trivedi, M. A.
Usman, M.
Vind, K.
White, G. E.
Williams, M. K. A.

THE following have been admitted to Library Membership of the Society:

Barnett House Library, Oxford.
British Information Services, New York.
Department of Economics, University of California, U.S.A.
Djakarta Economics Project, Indonesia.
Foreign Trade Research Institute, Belgrade.
International Christian University Library, Tokyo.
Iowa State Teachers College, Cedar Falls, U.S.A.
Leeds College of Commerce.
Naess & Thomas, New York.
Planning Research & Action Institute, Lucknow.
Rensselaer Polytechnic Institute Library, New York.
Sveriges Riksbank, Stockholm.

RECENT PERIODICALS AND NEW BOOKS

Journal of the Royal Statistical Society

VOL. 119, PART 2, 1956. *Some Aspects of the Geometry of Statistics: The Use of Visual Presentation in Understanding the Theory and Application of Mathematical Statistics:* E. S. PEARSON. *The Analysis of Business Concentration: A Statistical Approach:* P. E. HART and S. J. PRAIS. *Richard Jones: A Reappraisal:* R. GLENDAY.

Applied Statistics

VOL. V, NO. 2, JUNE 1956. *Examples of Interviewer Variability taken from Two Sample Surveys:* P. G. GRAY. *Some Sampling Problems in Connection with Accounting Records:* S. F. JAMES. *A Tasting Experiment:* N. T. GRIDGEMAN. *Are Correlations any Guide to Predictive Value?:* R. FERBER. *A 2^4 Factorial Experiment in Four Blocks of Eight: A Study in Radioactive Decontamination:* M. K. BARNETT and F. C. MEAD. *An Extension of the Use of the χ^2-Test:* E. K. LEANDER and D. J. FINNEY.

Economica

VOL. XXIII, NO. 91, AUGUST 1956. *Benelux: The Formation of the Common Customs:* J. E. MEADE. *Risk and Rank or Safety First Generalised:* A. D. ROY. *Inflation and Deflation in 1694–1696:* J. K. HORSEFIELD. *The United States National Income à la Russe:* A. NOVE. *Leisure and International Trade:* V. C. WALSH. *Charles Davenant and the East India Company:* D. WADDELL. *Multiplier and Velocity Analysis: An Annulment:* G. C. ARCHIBALD. *On the Calculation of Tax Burdens: A Rejoinder:* A. R. PREST.

The Review of Economic Studies

VOL. XXIII, NO. 62, 1955–56. *Myopia and Inconsistency in Dynamic Utility Maximization:* R. H. STROTZ. *The Estimation of Capital Consumption in National Accounting:* G. STUVEL. *The Trader's Behaviour in the Market Periods:* S. STYKOLT and A. SCOTT. *Economic Expansion and International Trade: A Marshallian Approach:* J. BLACK. *The Colonial Development Corporation, 1948–54:* E. R. WICKER. *A Note on the Colonial Development Corporation:* A. HAZELWOOD. *Comparative Statics in Linear Programming and the Griffen Paradox:* M. J. BECKMANN. *A Generalized Comparative Statics in Linear Programming:* M. J. BAILEY. *Stamp Duties as a Capital Gains Tax:* C. KENNEDY. *A Further Note on Dynamic Economics:* H. G. JOHNSON. *The Production Function and the Theory of Capital—A Reply:* J. ROBINSON.

The Economic History Review

VOL. IX, NO. 1, AUGUST 1956. *Property and the Price Revolution (Hainault, 1474–1573):* H. G. KOENIGSBERGER. *Seebohm's Tribal System of Wales:* T. LEWIS. *Some Price Fluctuations in Angevin England:* D. L. FARMER. *Wool Supply and the Woollen Industry:* P. J. BOWDEN. *Merchant Shipping in the Economy of the Late Seventeenth Century:* R. DAVIS. *The Ascendancy of the Sailing Ship, 1850–85:* G. S. GRAHAM. *Fire Insurance and the Capital Coefficient in Great Britain, 1866–1952:* K. MAYWALD.

The Journal of Industrial Economics

VOL. IV, NO. 3, JUNE 1956. *Highway Finance:* G. WALKER. *Concentration, Scale and Technological Change in Selected Manufacturing Industries, 1899–1939:* A. PHILLIPS. *Productivity in a Printing Firm:* F. A. WELLS. *Scale, Costs and Profitability in Road Passenger Transport:* J. JOHNSTON. *The Raw Cotton Commission: An Experiment in State Trading:* W. ROBERTSON.

The British Journal of Sociology

VOL. VII, NO. 2, JUNE 1956. *The Simplest Peoples: Part I—A Comparative Study; Part II—Peace and Order among the Simplest Peoples:* L. T. HOBHOUSE. *Applied Anthropology and Development Policies:* L. P. MAIR. *Some Remarks on "The Social System":* D. LOCKWOOD. *Juvenile Delinquency:* H. MANNHEIM.

VOL. VII, NO. 3, SEPTEMBER 1956. *The Morton Commission: A Social and Historical Commentary:* O. R. MCGREGOR. *Indians in East Africa: A Study in a Plural Society:* S. MORRIS. *Snobbery:* E. VAN DEN HAAG. *Islam and the Orientalists: Some Recent Discussions:* E. KEDOURIE. *Problems of Involvement and Detachment:* N. ELIAS. *Administration and Sociology in Dutch Indonesia:* H. T. CHABOT.

The Sociological Review

VOL. 4, NO. 1, JULY 1956. *The Political Power of Private Capital: II:* S. E. FINER. *Functionalism as a Social Theory:* R. FLETCHER. *Emile Durkheim's Theory of Knowledge:* P. M. WORSLEY. *The Climate of Opinion on Housing Estates:* J. M. MOGEY. *Social Research and the Administrator:* J. A. MACK. *British Conurbations in 1951:* G. W. S. ROBINSON. *Two Studies in Northern Cities:* J. SPENCER.

Population Studies

VOL. X, NO. 1, JULY 1956. *Fertility of Polygamous Marriages:* H. V. MUHSAM. *A Century of International Mortality Trends: II:* G. J. STOLNITZ. *Development of Plans for a Social Psychological Study of the Future Fertility of Two-child Families:* C. V. KISER, E. G. MISHLER, C. F. WESTOFF and R. G. POTTER. *The Trend of the Birth Rate in India, 1911–50:* A. GHOSH. *The Birth Statistics of Massachusetts during the Nineteenth Century:* R. GUTMAN. *Local Population Projections in England and Wales:* J. R. L. SCHNEIDER.

Journal of the Institute of Actuaries

VOL. 82, PART I, NO. 360, 1956. *Mortality of Assured Lives. Laws of Mortality which Satisfy a Uniform Seniority Principle:* T. N. E. GREVILLE. *Temporary Selection:* C. CARPMAEL. *The Geometric, Logarithmic and Discrete Pareto Forms of Series:* P. G. MOORE. *The Recent Trend of Mortality in Great Britain:* W. S. HOCKING.

International Affairs

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No. 3, 1956. *Calculating the Economic Efficiency of Investments:* J. PAJESTKA. *Technical Progress and Investment Outlays Per Unit:* B. MINC. *Labour Efficiency in the Building Industry in Various Countries:* S. KUROWSKY. *Profit-sharing as an Economic Incentive in Producer Co-operatives:* Z. FIEJKA. *Economic Incentives in the Textile Industry:* J. RACHWALSKI. *The Calculation of Domestic Consumption on Co-operative Farms:* M. POHORILLE. *The Social and Economic Background to the Indian Five-year Plan. A Criticism of Keynesian Theory:* I. RAFELSKI. *A Conference on Material Incentives in the Socialist Economy:* J. LISIKIEWICZ. *A Brief Outline of the History of Economic Thought in Bulgaria:* K. GRIGOROV. *The Economists' Conference in the German Democratic Republic:* J. ZAWADZKI.

No. 4, 1956. *The Present Economic Situation of the United States as Compared with that of the Pre-war Period:* M. KALECKI. *An Investigation of the Profitability of Different Branches of Production: in the Producer Co-operatives:* M. POHORILLE. *Problems Concerning the Intensification of Private Farming:* J. OKUNIEWSKI. *The Pricing of Comparable Agricultural Products:* E. GORZELAK and Z. KOZŁOWSKI. *On the Statistical Yearbook for 1955:* S. KUZIŃSKI and K. ŁASKI. *Bonus Systems in Metallurgy:* A. KAGAN and P. FALKOWSKI. *Economic Theory in the Works of W. Surowiecki:* A. ŁUKASZEWICZ. *Further Discussion on Productive and Unproductive Labour. Some Remarks on the Investigation into the Economic Efficiency of Investment:* A. KUMANOWSKY. *The Role of a Capital Fund:* B. MISZEWSKI. *Economic Problems of Building at the First National Building Conference:* W. BAGIŃSKI.

Gospodarka Planowa (*Polish text*)

MAY 1956. *The Activity and Experience of the Working Masses as a Base for Planning:* E. SZYR. *The Measurement of the Economic Effectiveness of Productive Investments:* J. PAJESTKA. *The Unsatisfactory Utilisation of Productive Reserves in the Chemical Industry:* L. KWIATKOWSKI. *The Reduction of Losses in Agricultural Production:* W. KOZAK. *The Simplification of Planning in Rural Trade:* W. SZULC. *The Present System of Investors' Bonuses Hinders Building Development:* T. KLUK. *The Effectiveness of Abrasive Materials in Industry and Building:* K. KIEBABCZY. *The Economic Advantages of Using Large Sections in Construction:* W. BORUSHIEWICZ. *Light Industry in the Five-year Plan:* W. STACEWICZ.

JUNE 1956. *Poland's Trade with the European People's Democracies:* J. KOBRYNER. *Problems in the Economics of Planning Repairs in Engineering:* J. KOPIŃSKI. *Does the Present Wage System Favour Increases in the Social Productivity of Labour?:* W. KRENCIK. *Some Remarks on Wages and "Culpable Deficits" in Retail Trade:* L. HOROWITZ. *Problems of Integrating Short- and Long-term Planning with Special Reference to Stockbreeding in Poznan:* W. MISIUNA. *Olsztyn Voivodship in the Five-year Plan:* E. BUJDRES. *The Proper Role and Organisation of the State Economic Planning Commission:* A. KARPIŃSKY. *How to Work for an Improve-*

ment: L. ZABKOVICZ. *Some Remarks on the Planning Commission:* S. FRENKEL. *The Need to Review the Functions of Central Boards:* O. FELDMAN. *Increase the Autonomy of Managements:* K. PODOSKI. *End Exaggerated Centralization in Local Planning:* E. BUJDENS. *The Need for a National Meeting of Planning Workers:* M. PIASECKA. *The Second Five-year Plan of the German Democratic Republic:* G. PISARSKI. *Studies in Engineering Economics in Czechoslovakia:* V. KALAS.

JULY 1956. *On the Need for a New, Fruitful Development of Creative Marxist Economics in Poland:* O. LANGE. *The Law of Value under Socialism:* W. BRUS. *A Comment on the Discussion on the Law of Value under Socialism:* M. POHORILLE. *Investment Efficiency during the Six-year Plan in Ferrous Metallurgy:* J. GWIAŹDZINSKY. *Co-operation in Planning and Executing Export Promotion Needs Improvement:* A. ROLOW. *The Role of Analysis of Economic Activity in Planning and Administration:* J. ISZKOWSKI. *The Need for More Effective Long-term Planning:* M. RAKOWSKI. *Indispensable Changes in the Planning System:* B. MINC. *Some Suggestions for New Methods of Regional Planning:* M. OPALLO. *Regional Planning Methods Need Reconsideration:* T. MRZYGLOD.

Plánované Hospodářství (*Czech text*)

No. 5, 1956. *Improve the Planning and Direction of the Economy. Raise the Standard of Economics. Some Problems of the Organisation of Repairs:* J. ČERVENKA. *The Establishment of Production Plans on State Farms:* M. ZICH. *More Intensive Analysis is Needed of Building Practice:* A. VANĚK. *The Planning of the National Economy:* J. TOMAN.

No. 6, 1956. *Depreciation Allowances and Their Importance in the Economy:* F. BOREŠ. *Problems of Complex Mechanisation and the Application of Chemicals in Agriculture:* R. RUFFER. *Increasing the Technical Standard of Consumer Goods Production:* K. KEJZLAR. *Unused Resources in Forest Utilisation:* K. DVOŘÁK.

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Planovo Stopanstvo (*Bulgarian text*)

No. 3, 1956. *The Organisation of Wages in Industry:* I. ILIEV. *The Fulfilment of the Assortment Plan is the Main Factor in the Comprehensive Fulfilment of the National Economic Plan:* K. KRAEV. *The Reduction of Industrial Costs:* I. KOSTOV. *Rationalisation and Innovation:* V. SHUBRANOV and D. BAZHDAROV. *Material Input Norms:* D. DOCHEV. *Internal Factory Accounting:* M. DEVEDZHIEV. *The Economic Situation in Poland:* M. KERBEL.

No. 4, 1956. *A Broad Programme for the Strengthening of Co-operative Farms and the Expansion of Agriculture:* L. KAZAKOV. *For a Full Utilisation of Industrial Capacity:* V. VAKANOV. *Statistical Standardisation in Road Transport:* A. KALO. *Deeper Studies Should be Made on Consumer Research:* ZH. NAIDENOV. *The Reduction of Excess Building Costs—An Important Economic Task:* G. SHOPOV. *The Introduction of Suitable Crop Rotations in Collective Farms Under the New Agricultural Planning Regulations:* M. DIMITROV. *Production Programming in Industry:* V. DONKOV. *Economic Development in Democratic Vietnam:* KH. MARINOV.

Finansi i Kredit (*Bulgarian text*)

No. 1, 1956. *For a Strengthening of Work on Fulfilling the 1956 Budget:* K. LAZAROV. *The Sixth Reduction of Retail Prices:* K. DANOV. *The Assessment of Working Capital in State Farm Balance Sheets:* L. RALCHEV. *The Use of Model Plans in Building:* D. SAPUNDZHIEV. *The Functions of Banks in Analysing the Annual Accounts of Enterprises:* P. PETKOV. *Compulsory Property Insurance:* D. POPVASILEV.

No. 2, 1956. *The XXth Congress of the Communist Party of the Soviet Union. The Soviet-Bulgarian Economic Agreement. Our Tasks:* K. LAZAROV. *The Protection of State Property:* I. PALISKY. *Ways to Improve Financial Control through the Inspectorate:* M. GANEV. *The Improvement of Commercial Agreements and Legal Protection Thereof:* D. MIRKOV. *Cost Analysis and Planned Accumulation in Building:* N. ABADZHIEV.

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No. 5, 1956. *For a Successful Fulfilment of the 1956 Budget:* G. BOKOV. *Ten Years of the State Insurance Fund:* Z. MITOVSKY. *The Bulgarian Investment Bank's Control over Capital Construction:* K. ZANEV. *Some Clarifications and Improvements Needed in the Grant of Temporary Loans on Unfinished Production:* D. KASABOV. *The Qualities and Knowledge Required of Executive Directors:* I. IVANCHEV. *The New Loan in the Soviet Union:* P. PANTELEEV.

No. 6, 1956. *The Decisions of the XXth Party Congress and the Future Tasks of the State Banks of the U.S.S.R.:* V. POPOV. *Easier Credit for Consumer Goods Enterprises:* R. CHUBRIEV. *The Correct Terms for Insurance Compensation:* Z. MITOVSKY. *The Legal Relationships of the National Bank, the Investment Bank, the State Insurance Fund and the State Savings Bank with the Supreme Court:* D. MIRKOV. *The New Credit System for Trade Stocks:* G. MATEEV.

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Ikonomicheska Misl (new journal; Bulgarian text)

VOL. I, No. 1, 1956. *The Building of Socialism and the Tasks of Economics. Under the Sign of Lenin. The Raising of Labour Productivity at the Current State of Our Development:* E. MATEEV. *Ways to Cut M.T.S. Costs:* G. MINCHEV. *The Fundamental Problems of Increasing Fodder Supplies:* D. BAKARDZHIEV. *The Productivity and Intensity of Labour in Capitalist Countries:* S. SUKMANDZHIEV.

VOL. I, No. 2, 1956. *Dimiter Blagoev, the First Bulgarian Marxist Economist:* ZH. NATAN. *Investment Financing in the Second Five-year Plan:* K. LAZAROV. *Reserves for Increasing Productivity in Engineering:* N. MITEV. *The Use of New Technique in the Cotton Industry:* A. MACHIAKH. *The Organisation of Industrial Supplies:* B. PERVULOV. *Fresh Vegetable Deliveries to Sofia and the Tasks of Suburban Market Gardening:* D. BRADISTILOV. *The 1956 Session of the Economic Commission for Europe:* T. VLADIGEROV. *Foreign Capital Penetration in Bulgaria:* L. GEORGIEV.

Ekonomist (Croat text)

No. 2, 1956. *The Problem of Introducing Input–Output Tables into Our Country:* A. ORTHABER. *An Approach to the Question of the Relationship between Simple and Complex Work According to the Theory of Value:* Z. PJANIĆ. *Free Competition and Its Part in Marx's General Analysis of Capital:* M. SAMARDŽIJA. *Salary Differences among Employees. Agricultural Labour Productivity:* J. RADAKOVIĆ. *Some Problems Concerning the Stabilisation of Markets:* R. RADOVANOVIĆ. *Economic Consequences of Capital Imports under the Jugel-export Scheme:* V. PERTOT.

Kozgázdasagi Szemle (Hungarian text, English and Russian summaries)

No. 5, 1956. *Experimental Calculations of Capital Coefficients and Our Place in the International Division of Labour:* T. LISKA. *The System of National Economic Balances in Planning:* M. ACS. *Problems of Method and Practice in Improving Planning on State Farms:* S. KOPÁTSY. *How to Increase Labour Productivity in Agriculture:* L. NAGY. *The Austrian Export Boom and the State Treaty:* E. JÓNAI. *Research Work in Economics Faculties of Universities:* P. PILLIS. *The Examination of a Candidate's Dissertation:* T. BIHALY. *The Precision Instrument Industry as a Factor in Technical Development:* G. DOROSZLÓI. *Some Problems of Vegetable Production and Consumption:* L. CSELÖTEI. *The Leipzig Fair—A New Step in the Development of East–West Contacts:* G. SZÉKELY.

No. 6, 1956. *Helping the Five-year Plan through Keen Economic Discussion. Some Problems of Political Economy:* T. NAGY. *Theoretical Problems of Economic Planning:* P. ERDÖS. *The Importance of Strict Economy and Profitability in a Planned Economy:* G. PÉTER. *The Supply of Agricultural Manpower and Long-term Regional Planning:* L. GÖRÖG. *The Gradual Introduction of Autonomous Financing in Machine-tractor Stations:* I. GÖNCZI. *The Economic Situation of the German Democratic Republic After the First Five-year Plan:* M. KORNIS. *The Modernisation of Factory Transport and Loading as a Factor in Raising Productivity:* G. PARÁNYI.

Nos. 7–8, 1956. *Contributions to the Debate at the General Assembly of the Hungarian Academy of Sciences:* I. Friss, F. Donáth and T. Nagy. *Results and Possibilities of Co-operation between Hungary and Other Countries of the Socialist Camp:* T. Kiss. *On the International Economic Relations of the Transition Period:* G. Göncöl. *A Few Experiences of Five-year Plan Drafting by Enterprises:* S. Balázsy. *The Second Five-year Plan and State Farms:* G. Nagy. *The Importance of Strict Economy and Profitability in a Planned Economy (II):* G. Péter. *The End-of-month Rush and the Mechanism of Our Economy:* A. Bródy. *Some Problems of Our Cotton Exports:* A. Máriás and A. Nagy. *Foreign Trade between Yugoslavia and Other Socialist Countries:* A. K. and F. M. *The Training of Economists in People's Poland:* I. László. *Nuclear Energy and Automation:* G. Ádám. *Serving Technical Progress:* E. Megyeri. *Poland as Seen by an Economist:* S. Ganczer. *The Examination of a Candidate's Dissertation:* P. E. *The First Results of the New Wholesale Price System in Forestry and the Timber Industry:* I. Tömpe. *Experimental Planning Methods at the Duna Shoe Factory:* Zs. E. *Our New Income Tax System in Agriculture:* F. Gönczöl and J. Lábán.

No. 9, 1956. *For the Development of Socialist Democracy and for Economic Progress. The Situation and Problems of Long-term Regional Planning:* K. Szabó. *Fundamental Problems of Rationalisation in the Supply of Materials:* F. Sovány. *The Chemical Industry and the Development of Agricultural Production:* I. Kiss. *Economic Relations between the Socialist Countries and Egypt:* F. Molnár. *New Problems of Economic Planning in India:* Zs. E. *The Development of Producers' Co-operatives in Pest County:* G. Kovacs. *Social Democratic Theories on Large- and Small-scale Units in Agriculture under the Horthy Régime:* I. Kádár.

Statisztikai Szemle (*Hungarian text, English and Russian summaries*)

May 1956. *Remarks on the Economic Survey of Europe in 1955 Published by the Secretariat of the Economic Commission for Europe:* J. Zala. *The Functioning of the Hungarian Credit System as it Relates to Profitability:* G. Lang. *The Regional Distribution of Purchasing Power and Its Measurement:* I. Fenyö and F. Zala. *Some New Methods of Standardization:* G. Párniczky. *Inland Migration of Population in Hungary:* G. Acsádi.

June 1956. *The System of Central Authorisation of Statistical Questionnaires:* I. Pálos. *Reserves in the Socialist Sector of Agriculture:* M. Barabás. *On the Logical Basis of Statistical Grouping:* D. Nagy. *The Discussion on Indicators of Short-term Economic Changes at the Working Group of the Conference of European Statisticians:* J. Rédei. *The Methodology of National Income Statistics in Capitalist Countries:* Z. Kenessy, V. Neményi and J. Simon. *Aggregation of the Output of the Ministry of Metallurgy and Engineering:* J. Palik. *The Retail Shop Network in Suburban Budapest:* E. Rubin.

July–August 1956. *Improving Industrial Technology:* J. Lacfalvi. *Construction Time in the Building Industry:* J. Tar. *Trends and Capacity Use in the Building Materials Industry 1945–1955:* A. Marfai. *The Cost-of-Living Index:* J. Árvay. *Problems of Index Number Weighting:* P. Köves. *Relics of Hungarian Statistics from the Middle Ages:* I. Mészáros.

Probleme Economice (*Rumanian text, French and Russian summaries*)

No. 5, 1956. *The Workers' Party Struggle for Strengthening the Alliance between Workers and Working Peasants. Towards an Improvement in Research in Agricultural Economics. The Main Problems of Stockbreeding in the Second Five-year Plan:* V. Gligor. *Experience of the Galats Region in Collectivisation:* G. Vîlceanu and I. Stan. *The Regional Distribution of Agriculture and State Farm Specialisation:* V. Pascovschi. *Labour Organisation in Agricultural Working Association:* D. Dumitriu. *The Economic Importance of Maize:* S. Hartia and O. Gheorghiu. *Agricultural Location in Bulgaria:* T. Cernokolev. *Shortcomings in the Use of Agricultural Technology under Capitalism:* P. Dan.

No. 6, 1956. *On the Location of Industry under Socialism:* N. Stern and M. Costache. *The Coal Industry in the Second Five-year Plan:* M. Pîrjol. *Agricultural Collectivisation in the Constanza Region:* S. Hartija and O. Gheorghiu. *Some Problems in the Development of Public Catering:* C. Florescu and D. Dima. *The Deterioration of Urban–Rural Relations under Contemporary Capitalism:* I. Besteliu. *Bălcescu's Interpretations of Serfdom as Instituted by Michael the Brave:* V. Ionescu. *On the General Law of Capitalist Accumulation:* Gh. Dolgu.

NEW BOOKS

British

ALEXANDERSSON (G.). The Industrial Structure of American Cities. A geographic study of urban economy in the United States. London: Allen & Unwin (Stockholm: Almqvist & Wicksell; Lincoln, Nebraska: University of Nebraska Press), 1956. 10″. Pp. 133. 40*s*.

[This volume is built around its maps and diagrams. Maps of the United States are given showing the number of workers in each major industry in each town of 10,000 or more inhabitants where 200 or more workers are engaged in that industry. These are supplemented by further maps and cumulative distribution diagrams showing the number and size of the towns in which the industry in question provides employment for more than a specified proportion of the working force. The purpose is largely to provide measures of the city-forming potentialities of industries. A running commentary accompanies the maps and diagrams and discusses their salient features and the probable explanations of them. The book is of interest both as a source of detailed information for reference and as an experiment in cartographic methods.]

BARKER (G. R.). Some Problems of Incentives and Labour Productivity in Soviet Industry. A contribution to the study of the planning of labour in the U.S.S.R. Oxford: Basil Blackwell, for the Department of Economics and Institutions of the U.S.S.R. of the University of Birmingham, 1956. 9″. Pp. 129. 14*s*.

[Reviewed in this issue.]

BELL (P. W.). The Sterling Area in the Postwar World. Internal mechanism and cohesion, 1946–52. London: Oxford University Press, 1956. 9″. Pp. 478. 63*s*.

[To be reviewed.]

BELSHAW (H.). Population Growth and Levels of Consumption, with special reference to countries in Asia. Issued under the auspices of the International Secretariat, Institute of Pacific Relations. London: Allen & Unwin, 1956. 9″. Pp. vii + 223. 25*s*.

[To be reviewed.]

CROSLAND (C. A. R.). The Future of Socialism. London: Jonathan Cape, 1956. 9″. Pp. 540. 42*s*.

[To be reviewed.]

DARBY (H. C.). The Draining of the Fens. Second Edition. London: Cambridge University Press, 1956. 8½″. Pp. 314. 35*s*.

[The first edition of this book was reviewed by Mr. C. R. Fay in the ECONOMIC JOURNAL of June–September 1940, p. 301. It is here re-issued with some minor corrections and a brief account of developments since 1940.]

DEPARTMENT OF AGRICULTURAL ECONOMICS, UNIVERSITY OF BRISTOL. Three Year Summary of the Broccoli Investigation in West Cornwall, 1952–55, by H. M. COLE; Report No. 89; 10½″; pp. 10; 1*s*. 6*d*. Some Economic Aspects of the Early Potato Crop in Cornwall, Three-year Investigation, 1952–54, by H. M. COLE; Report No. 91; 9″; pp. 32; 2*s*. 6*d*. Milk Production on the Small Farm; Dairy Research Study, 1953–55, Part III; Report No. 92; 9″; pp. 47; 3*s*. An Economic Analysis of Pig Production on South Western Farms, 1954–55, by E. BURNSIDE and W. W. STRONG; Report No. 93; 9″; pp. 47; 2*s*. 6*d*. Some Economic Aspects of Seasonality in Milk Production, by V. H. BEYNON and J. A. LANGLEY; Report No. 94; 10½″; pp. 26; 2*s*. 6*d*. Tractor Operating Costs and Performances on a Sample of Farms in South West England 1955; Report No. 95; 10½″; pp. 26; 2*s*. Farm Organisation and Incomes in South West England, 1954; Report No. 96; 9″; pp. 62; 5*s*. Newton Abbot: Department of Economics, University of Bristol, 1956.

DEPARTMENT OF AGRICULTURAL ECONOMICS, UNIVERSITY OF MANCHESTER. Rearing Dairy Herd Replacements: Does it Pay? by J. E. HOLT and T. W. GARDNER; Bulletin No. 82; 10″; pp. 23; 3*s*. A Study of Farm Organisation and Management in the North West 1953/54 and 1954/55; Bulletin No. 83; 10″; pp. 121; 5*s*. Manchester: Department of Agricultural Economics, University of Manchester, 1956.

DEPARTMENT OF AGRICULTURAL ECONOMICS, UNIVERSITY OF READING. Financial Results on Farms in the Southern Province in 1952/53 and 1953/54, by G. B. BISSET; Farm Management Survey Report No. 5; 9½″; pp. 31; 5*s*. The Milk-selling Farms of Buckinghamshire, by R. S. COOK and A. H. GILL; Miscellaneous Studies, No. 9; 9½″; pp. 80; 8*s*. 6*d*. Reading: Department of Agricultural Economics, University of Reading, 1956.

DEVONS (E.). An Introduction to British Economic Statistics. London: Cambridge University Press, 1956. 7½″. Pp. 255. 22*s*. 6*d*.

[Reviewed in this issue.]

DEWAR (M.). Labour Policy in the U.S.S.R., 1917–1928. London: Royal Institute of International Affairs, 1956. 9½″. Pp. 286. 45*s*.

[Reviewed in this issue.]

EINZIG (P.). The Economic Consequences of Automation. London: Secker & Warburg, 1956. 9″. Pp. vii + 226. 21*s*.

[To be reviewed.]

GARDNER (R. N.). Sterling–Dollar Diplomacy. Anglo-American collaboration in the reconstruction of multilateral trade. London: Oxford University Press, 1956. 9″. Pp. vii + 423. 42*s*.

[To be reviewed.]

INTERNATIONAL ECONOMIC ASSOCIATION. International Economic Papers, No. 6. Edited by A. T. Peacock, R. Turvey, W. Stolper and E. Henderson. London: Macmillan (New York: The Macmillan Co.), 1956. 10″. Pp. 211. 15*s*.

[To be reviewed.]

KURIHARA (K. K.). Introduction to Keynesian Dynamics. London: Allen & Unwin, 1956. 9″. Pp. 222. 21*s*.

[To be reviewed.]

MUNBY (D. L.). Christianity and Economic Problems. London: Macmillan, 1956. 8½″. Pp. 290. 25*s*.

[To be reviewed.]

THE NUFFIELD FOUNDATION. Report for the Year Ended 31 March 1956. London: The Nuffield Foundation, 1956. 9″. Pp. 160.

[This includes the usual full account of research activities supported by the Foundation.]

PLANT (SIR A.). The Substance and the Shadow: Reflections on Prosperity. Third Fawley Foundation Lecture. Southampton: University of Southampton, 1956. 8½″. Pp. 22. 2*s*. 6*d*.

[In this lecture Sir Arnold Plant suggests that the precarious element in our present prosperity is a large one. Chief among the sources of this precariousness is inflation. Not merely does inflation discourage saving and threaten our balance of payments; in addition, it has a distorting effect on the conduct of business, especially when taken in conjunction with the high rates of taxation that are at least partly dictated by the desire to repress it. Sir Arnold devotes particular attention to the effects of profits tax. He suggests that the present operation of this tax encourages the growth of existing firms at the expense of the formation of new ones, and this, he holds, tends to reduce efficiency by preventing the necessary specialisation of function between firms.]

Readings in Market Research. A selection of papers by British authors. London: British Market Research Bureau, 1956. 10″. Pp. ix + 235. 35*s*.

[To be reviewed.]

RISK (J. M. S.). The Classification and Coding of Accounts. Institute of Cost and Works Accountants, Occasional Paper No. 2. London: Copies obtainable from the distributors, Gee & Co., 1956. 9½″. Pp. 79. 7*s*. 6*d*.

[The first half of this discusses in general terms the principles of classification and descriptive coding of classes, as applied in many branches of work, for example, librarianship. The author then goes on to apply these principles to the preparation of accounts.]

ROBERTSON (SIR DENNIS). Economic Commentaries. London: Staples, 1956. 8″. Pp. 174. 16*s*.

[To be reviewed.]

ROSSITER (C.). Conservatism in America. London: Heinemann, 1956. 7½″. Pp. 330. 21*s*.

[This book is a brave attempt to rally the intellectual elements of American conservatism in order to provide an appropriate statement of beliefs for Americans during this undoubted period of conservative, nationalistic temper. Mr. Rossiter leans heavily on the classics of European conservatism, as well as on those of his own country. But a European observer cannot help being sceptical of the relevance of the innate conservatism of England for a State which is the child of revolution and a people whose instinctive tradition has been radically progressive in society and politics.]

STRACHEY (J.). Contemporary Capitalism. London: Gollancz, 1956. 9″. Pp. 302. 25*s*.

[Reviewed in this issue.]

WILES (P. J. D.). Price, Cost and Output. Oxford: Basil Blackwell, 1956. 9″. Pp. 302. 30*s*.

[To be reviewed.]

Australian

VARGOVIC (C. A.). A Survey of Structural Changes in the Western Australian Economy. A statistical interpretation. Nedlands: The University of Western Australia Press, 1956. 10″. Pp. 109. 8*s*. 6*d*.

[Census and other data are used to show trends in relative employment and output in different industries and industry groups in Western Australia since before the War and since 1921. These trends are compared with the corresponding ones for Australia as a whole. Some interesting information is included on capital formation and its relation to productivity.]

South African

ARNDT (E. H. D.). The Union's Gold Reserve. Pretoria: South African Reserve Bank, 1956. 8½″. Pp. 63.

[This contains two separate addresses, one in Afrikaans with an English summary, the other in English. The author is Deputy Governor of the South African Reserve Bank. The first is concerned mainly with the interpretation of the published figures relating to the Union's gold reserve, which are often not properly understood. The second deals with the Reserve Bank's gold policy.]

VAN WAASDIJK (T.). Hire Purchase Credit in South Africa. An economic survey. Johannesburg: Witwatersrand University Press, 1956. Pp. 174. 21*s*.

[This is an extremely thorough and detailed study based on inquiries among dealers and others directly concerned with hire purchase in South Africa. The author's chief aim has been to collect information, but a good deal of interesting discussion and interpretation of the data is also included. The scope and importance of hire purchase in the Union are broadly similar to what they are in England, but there are some marked differences in organisation and finance. In the Union dealers play a much larger part in the finance of hire purchase and specialised finance houses a smaller one than is the case in most other countries.]

Indian

DANDEKAR (V. M.). Use of Food Surpluses for Economic Development. Gokhale Institute of Politics and Economics, Publication No. 33. Poona: Gokhale Institute of Politics and Economics, 1956. 9½″. Pp. 153. 7*s*. 6*d*.

[This report was drawn up to provide background information for the Indian Pilot Study undertaken by the Food and Agriculture Organisation of the United Nations in connection with their study on the uses of agricultural surpluses. (The F.A.O. report was noted in the ECONOMIC JOURNAL, March 1956, p. 210.) In it Dr. Dandekar reviews the evidence on nutrition and the standard of living generally in India at the present time and considers the extent to which recent development schemes have created employment opportunities and otherwise improved the situation.]

VAKIL (C. N.) and BRAHMANAND (P. R.). Planning for an Expanding Economy. Accumulation, employment and technical progress in underdeveloped countries. Bombay: Vora, 1956. 9″. Pp. xv + 404. 20*s*.

[To be reviewed.]

American

ABRAMOVITZ (M.). Resource and Output Trends in the United States since 1870. National Bureau of Economic Research, Occasional Paper 52. New York: National Bureau of Economic Research, 1956. 9½″. Pp. 23. $0.50.

[In the first part of this brief paper the author compares the rates of growth of output, population, man-hours, capital and some other similar magnitudes in the United States between 1869–78 and 1944–53. The results are used to point to some tentative conclusions about the relative importance of increased factor inputs and increased productivity in bringing about the increase in output. Some of these conclusions must be interpreted in the light of the author's practice of measuring resource input as a weighted average of man-hours and capital, a practice which to some readers may appear not too meaningful. The second section reviews the evidence bearing on whether the rate of growth has tended to diminish, and the interesting conclusion is reached that if there has been any such diminution, it has resulted from a fall in the total input of resources *per capita* rather than from a decline in the rate of growth of output per unit of input. The third section discusses the question of secular fluctuations in the rate of growth.]

ALDERFER (H. F.). American Local Government and Administration. New York and London: The Macmillan Company, 1956. 8½″. Pp. 662. 41*s*. 6*d*.

[This text-book is designed to provide a comprehensive survey of its field. It is primarily concerned with questions of political organisation, but two chapters are devoted to the economic aspects of local government.]

BENSON (L.). Merchants, Farmers and Railroads. Railroad regulation and New York politics, 1850–1887. Cambridge, Mass.: Harvard University Press (London: Geoffrey Cumberlege), 1955. 9½″. Pp. 310. 45*s*.

[This volume is a scholarly contribution to the growing corpus of monographs on American railway history. It is concerned with the shifts in public opinion in New York State about the trunk lines, largely in the period after 1873, which culminated in the Inter-State Commerce Act of 1887. Using as evidence a variety of new sources, such as the proceedings of trade, farmers' and railway reform associations, as well as State papers and newspapers, the author reveals the multiplicity of interests which lay behind the drive for railway regulation. In New York State, at any rate, the movement represented no simple agrarian crusade. Upstate farmers, it is true, added the force of their agitation against through-rates from the prairies which discriminated against their produce; but important groups of merchants in New York City took exception to favouritism and corruption, and especially to the practice of charging higher rates to New York than to her rivals in order to compensate for the greater natural advantages of that port; and a more diffused public opinion joined in the growing demand for regulation, from do-gooders and doctrinaires of *laissez-faire*, to railway stockholders anxious to insure against bad or corrupt management. There seems no reason to take issue with Mr. Benson's conclusion that this attack on *laissez-faire* was concerned to preserve rather than undermine property rights and private enterprise.]

The Changing Environment of International Relations. Brookings Lectures, 1956. Washington, D.C.; The Brookings Institution, 1956. 8½″. Pp. 158. $2.50.

[The six lectures contained are: "Mass Aspirations and International Relations," by Grayson Kirk; "Science, Technology and International Relations," by Harrison S. Brown; "Conflicts Arising out of Differing Governmental and Political Institutions," by Denis W. Brogan; "Emerging Requirements for an Expanding World Economy," by Edward S. Mason; "Asian Co-operation with the West," by Harold H. Fisher; and "American Interest in Asian Development," by Willard L. Thorp.]

CROTEAU (J. T.). The Federal Credit Union. Policy and practice. New York: Harper & Brothers, 1956. 8½″. Pp. 210. $4.00.

[Credit unions are a form of friendly society which has shown rapid growth in the United States in the last twenty years. Slightly more than half of them operate under state charters; the remainder, with which alone this book is concerned, under federal charters. The union provides its members with facilities for saving money and for obtaining loans. It caters mainly for middle- and lower-income groups. Loans for the purchase of consumer durables and in order to meet emergency needs (medical expenses, etc.) are of about equal importance and comprise the bulk of the loans made. The author analyses the assets and liabilities of federal-chartered credit unions, their financial results, their operating policies and the government regulations to which they are subject. He concludes with some suggestions of how to increase their usefulness.]

DePodwin (H. J.). Discharging Business Tax Liabilities. New Brunswick, New Jersey: Rutgers University Press, 1956. 9″. Pp. 167. $4.00.

[This is an interesting study of an aspect of public finance that has not hitherto received much systematic attention—the effect on the financial position of firms of regulations governing the time and method of discharging their tax liabilities. As the author points out, changes in these regulations have sometimes been more important to business than changes in rates of tax. The two aspects of the question are represented by excise duties payable in advance of sales, which require financing, on the one hand, and corporate income taxes payable in arrears, which provide a source of finance, on the other. The author traces the historical development of regulations on this subject in the United States, and analyses their effects on different sizes of firm. He suggests that the need for working capital imposed by the prepayment of excises in such industries as liquor and tobacco has materially contributed to the trend towards concentration in these industries by putting pressure on firms with limited resources. Dr. DePodwin concludes by examining the likely effects of recent legislative changes designed to speed up corporate income-tax payments.]

Edwards (Corwin D.). Big Business and the Policy of Competition. Cleveland, Ohio: Western Reserve University Press, 1956. 9″. Pp. 180. $3.50.

[To be reviewed.]

Greenhut (M. L.). Plant Location in Theory and Practise. The economics of space. Chapel Hill, North Carolina: The University of North Carolina Press, 1956. 9½″. Pp. v + 338. $7.50.

[To be reviewed.]

Halm (G. N.). Economics of Money and Banking. Homewood, Illinois: Richard D. Irwin, 1956. 9½″. Pp. 577. $7.20.

[To be reviewed.]

Harris (C. L.). The American Economy. Principles, practices and policies. Revised edition. Homewood, Illinois: Richard D. Irwin, 1956. 9″. Pp. 816. $7.20.

[The first edition of this appeared in 1953. It has now been thoroughly revised. Its purpose is to serve as a general introductory text-book for American students, and it sets out to provide the essential tools of economic analysis as well as descriptive material.]

Hayes (D. A.). Appraisal and Management of Securities. New York and London: The Macmillan Company, 1956. 8½″. Pp. 383. 31*s.* 6*d.*

[Most of this book is devoted to methods of assessing the investment characteristics of particular companies and particular classes of shares in them. Briefer treatment is given to the problem of how to make up an investment portfolio suitable to the individual needs of the investor.]

Knight (F. H.). On the History and Method of Economics. Selected essays. Chicago, Illinois: University of Chicago Press (London: Cambridge University Press), 1956. 9½″. Pp. 309. 45*s.*

[To be reviewed.]

The Kress Library of Business and Economics. Catalogue Supplement, covering material published through 1776 with data upon cognate items in other Harvard Libraries. Boston, Mass.: Baker Library, Harvard Graduate School of Business Administration, 1956. 11½″. Pp. 175.

[The Kress Library was established through the generosity of Mr. E. W. Kress and greatly enriched by the acquisition in 1936 of Professor H. S. Foxwell's second collection of rare economics books and pamphlets. (Foxwell's first collection was purchased by the Goldsmith's Company in 1901 and presented by them to the University of London.) It has since been extensively enlarged by gifts and transfers from various sources. A catalogue was published in 1940, which included also items of similar interest in other Harvard libraries. The present supplement lists acquisitions since 1940. This very handsome volume has been printed in England by the Cambridge University Press.]

McMurry (D. L.). The Great Burlington Strike of 1888. A case history in labor relations. Cambridge, Mass.: Harvard University Press (London: Geoffrey Cumberlege), 1956. 9½″. Pp. v + 377. 48*s.*

[The important strike of drivers and firemen against the powerful Chicago, Burlington and Quincy Railroad in 1888, hitherto neglected, has been fortunate in its historian. Professor McMurry has achieved the rare success of transforming a specific and limited subject into an

important historical study, with a depth and suggestiveness which illuminate not merely the circumstances of the strike, but the enveloping social and economic environment. Working from the Burlington records in the Newberry Library, he has written a vivid and masterly account which should be as interesting to the general reader with a penchant for railways as it is to the specialist. It brings out the complexity of an industrial dispute; for there were conflicts among different unions and trades, as well as among railroad operators. The characters of the leaders on both sides clearly emerge from their correspondence, and such human factors as the personalities of general manager and president are given due weight in the developing conflict. The revelations, especially, concerning railroading methods, assumptions about company loyalties, business ethics and attitudes towards labour, make the book a valuable adjunct to the work of Professors Overton, Cochran and others, and help to modify the stereotyped accounts of late-nineteenth-century industrial relations.]

MANNE (A. S.). Scheduling of Petroleum Refinery Operations. Harvard Economic Studies, Volume XCVIII. Cambridge, Mass.: Harvard University Press (London: Geoffrey Cumberlege), 1956. 8½". Pp. 185. 40*s*.

[The purpose of this book is to apply the techniques of mathematical economics to the complex problems of joint supply and such-like conditions that arise in petroleum refining. Four case studies are analysed, the first three relating to individual elements in scheduling and the last dealing with the more general problem of co-ordinating the operations of an integrated company. A variety of mathematical techniques are used for handling these problems, including graphical methods, the calculus, linear programming and several species of non-linear programming.]

PETERSEN (W.) (Ed.). American Social Patterns. New York: Doubleday, 1956. 7". Pp. 263. $0.95.

[This contains five items. The second and fourth are reprints and the others are abridgements of previously published works. The titles and authors are: "Interracial Housing," by M. Deutsch and M. E. Collins; "Biographies in Popular Magazines," by L. Lowenthal; "The People's Choice," by P. F. Lazarsfeld, B. Berelson and H. Gaudet; "Union Democracy and Secondary Organisation," by S. M. Lipset, M. A. Trow and J. S. Coleman; and "The Dynamics of Bureaucracy," by P. M. Blau.]

PIGOU (A. C.) (Ed.). Memorials of Alfred Marshall. Reprints of Economic Classics. New York: Kelley & Millman, 1956. 8½". Pp. 518. $8.50.

[*Memorials of Alfred Marshall*, containing selections from Marshall's occasional writings, together with Keynes' famous memoir and a group of other personal reminiscences, was first published in 1925 and has now been out of print for many years. The present welcome re-issue is in Messrs. Kelley and Millman's series of photographic reprints.]

REMER (C. F.) and KAWAI (S.). Japanese Economics. A guide to Japanese reference and research materials. University of Michigan, Centre for Japanese Studies, Bibliographical Series, No. 5. Ann Arbor, Michigan: University of Michigan Press (London: Geoffrey Cumberlege), 1956. 11". Pp. 91. 40*s*.

[This is a selected and classified list of writings in Japanese, designed to introduce foreign scholars to the Japanese research material. Brief introductions to each chapter survey the scope of the particular field dealt with in it and indicate the chief topics on which research has been done. The title and author of each item are given in both Japanese and Roman letters, and the titles are translated into English, with short notes added in many cases.]

ROBERTSON (R. M.). History of the American Economy. New York: Harcourt, Brace & Co., 1955. 9½". Pp. 593.

[This text-book was written for American freshman students in economics and business. Constructed on the sub-heading-and-inset principle, it is built up of short sections, each judiciously summarising the chief known facts and written in an easy, sometimes breezy, style. There is a wealth of useful figures and tables correctly deployed by an economist who recognises the limits of his methods in historical situations. But no student who did not already know some American history would make much of it, and it would be inadequate as an historical guide for an English sixth-former, at whose level it is pitched. This is a utility volume without much appeal to the export trade.]

SENNHOLZ (H. F.). How Can Europe Survive? Princeton, New Jersey and London: Van Nostrand, 1956. 9". Pp. 336.

[To be reviewed.]

SENNHOLZ (M.) (Ed.). On Freedom and Free Enterprise. Essays in honor of Ludwig von Mises. Princeton, New Jersey: Van Nostrand, 1956. 9½". Pp. ix + 333. $3.50.

[To be reviewed.]

SUTTON (F. X.), HARRIS (S. E.), KAYSEN (C.) and TOBIN (J.). The American Business Creed. Cambridge, Mass.: Harvard University Press (London: Geoffrey Cumberlege), 1956. 9½". Pp. 414. 55*s*.

[To be reviewed.]

Technical Co-operation in Latin America. Recommendations for the future, by the Special Policy Committee on Technical Co-operation of the National Planning Association. Washington, D.C.: National Planning Association, 1956. 9". Pp. 189. $2.50.

[This report is the result of a considerable programme of research into the working of technical co-operation in Latin America at the present time. Descriptions are given of the various forms of technical co-operation currently in practice, and recommendations are made both in relation to specific fields of activity and in relation to more general questions of administration by governments and other agencies.]

Russian

RICARDO (D.). Sochinenia. Translated under the editorship of M. N. SMIT, in three volumes. Moscow: State Publishing House of Political Literature, 1955. 9". Vol. I: pp. 360; 6 r. 75 k. Vol. II: pp. 392; 6 r. 50 k. Vol. III: pp. 295; 5 r. 85 k.

[Before the War a new Russian edition of the works of Ricardo was in preparation, to consist of five volumes: the first consisting of the *Principles*; the second of collected articles and speeches on questions of money and banking; the third of writings "on questions of agriculture, rent and the critique of Malthus"; the fourth of letters; and the fifth of his Parliamentary speeches. "Various old English editions" were used for this translation. The first two volumes appeared in 1941, with a print of 20,000 copies; but the outbreak of war interrupted the publication of the remaining volumes. The publisher's foreword to the new edition of 1955 announces that since these two volumes "have become by now a bibliographical rarity" they are being re-issued (again in a print of 20,000 copies), together with the third volume, which, in addition to the *Essay on Profits* and *Protection to Agriculture*, contains the *Notes on Malthus* ("published for the first time in the Russian language"). For this third volume the Royal Economic Society's edition of the *Works and Correspondence* of 1951–55 has been utilised, and acknowledgment is made thereto in the editor's foreword to the *Notes on Malthus* and in footnotes to the text when these are taken from the Royal Economic Society edition. There is no mention of the other two volumes originally planned.]

Danish

KJAER-HANSEN (M.). Selling Costs and Advertising Expenditure in Scandinavia. Federation of Nordic Marketing Associations Publication No. 1. Copenhagen: Federation of Nordic Marketing Associations, 1956. 10". Pp. 40.

[This presents the conclusions derived from a substantial project of statistical research. Information on selling costs in the broader sense is naturally more difficult to gather and interpret than information on advertising, and most of the report is concerned with advertising expenditure. Data are provided on total expenditure on advertising in the four countries and on its division between different media. As a percentage of gross national product, advertising expenditure (defined for this purpose to exclude retail-store advertising) is about the same in Sweden and Denmark as in Great Britain, viz., 1%. In Norway it is 0·6% and in Finland 0·5%.]

Dutch

BOS (H. C.). A Discussion on Methods of Monetary Analysis and Norms for Monetary Policy. Schiedam: Royal Netherlands Printing Office for the Netherlands Economic Institute, 1956. 9". Pp. 52.

[This is a summary and clarification of a debate that has recently been conducted in the columns of the weekly *Economisch-Statistische Berichten* between Dr. M. W. Holtrop and Professor H. J. Witteveen. Professor Witteveen's approach was, broadly speaking, a Keynesian one, while Dr. Holtrop's had more in common with classical doctrines. Differences between them arose partly from disagreements on causal relationships and partly from divergent definitions of "monetary equilibrium," a concept used sometimes in a descriptive sense and sometimes in a normative one by both authors.]

Italian

Scritti nei quali si fa riferimento al pensiero economico di Luigi Einaudi e recensioni di sue opere. Rome: Banca d'Italia, 1954. 9½". Pp. 158.

[This contains a list of books and articles in learned journals in which reference is made to Dr. Einaudi's works. Each item is accompanied by an indication of the passage or passages in Dr. Einaudi's writings to which the reference in question relates. This is followed by a list of published reviews of Dr. Einaudi's works.]

Official

BRITISH

HALL (H. D.) and WRIGLEY (C. C.). Studies of Overseas Supply. History of the Second World War, United Kingdom Civil Series, edited by Sir Keith Hancock. London: H.M. Stationery Office and Longmans, 1956. 9½". Pp. 537. 37*s.* 6*d.*

[Reviewed in this issue.]

HAMMOND (R. J.). Food. Volume II: Studies in Administration and Control. History of the Second World War, United Kingdom Civil Series, edited by Sir Keith Hancock. London: H.M. Stationery Office and Longmans, 1956. 9½". Pp. 835. 50*s.*

[To be reviewed.]

SAYERS (R. S.). Financial Policy, 1939–45. History of the Second World War, United Kingdom Civil Series, edited by Sir Keith Hancock. London: H.M. Stationery Office and Longmans, 1956. 9½". Pp. xi + 608. 37*s.* 6*d.*

[To be reviewed.]

CANADIAN

RESTRICTIVE TRADE PRACTICES COMMISSION, DEPARTMENT OF JUSTICE, OTTAWA. Report Concerning the Manufacture, Distribution and Sale of Boxboard Grades of Paperboard. Ottawa: Department of Justice, 1956. 9½". Pp. 243.

[Producers in the Canadian boxboard manufacturing industry, which is of considerable magnitude, have over a long period of years had their prices and other conditions of sale controlled by incorporated organisations of which they and their representatives have been the shareholders. This report is concerned to describe the methods and extent by which competition has thereby been lessened and to appraise the defences of the arrangements that have been put forward on behalf of the manufacturers.]

RESTRICTIVE TRADE PRACTICES COMMISSION, DEPARTMENT OF JUSTICE, OTTAWA. Report Concerning the Manufacture, Distribution and Sale of Quilted Goods, Quilting Materials and Related Products. Ottawa: Department of Justice, 1956. 10". Pp. 78.

[The combine complained of was effective for only a short period because of the strength of competitive tendencies in the industry, but it is found that during that period it operated price-fixing arrangements, a quota system and restrictions on entry.]

AMERICAN

JOINT COMMITTEE ON THE ECONOMIC REPORT. Characteristics of the Low-income Population and Related Federal Programs. A report prepared by the staff of the Subcommittee on Low-income Families. Washington, D.C.: U.S. Government Printing Office, 1956. 9". Pp. 240.

JOINT COMMITTEE ON THE ECONOMIC REPORT. Program for the Low-income Population at Substandard Levels of Living. Washington, D.C.: U.S. Government Printing Office, 1956. 9". Pp. 14.

[Information is given of the number of low-income families and individuals in the United States in 1948 and 1954 and their distribution between different types. Comparatively little progress was made between these dates in eliminating the problem, despite the rise in national income. The characteristics of the chief types of low-income receivers—the elderly, the disabled, etc.—are further analysed in a series of special memoranda. The Program suggests remedial measures along three main lines: the extension of social-security benefits, the improvement of educational and training facilities, and aid to depressed industries and areas.]

JOINT COMMITTEE ON THE ECONOMIC REPORT. Trends in Economic Growth. A comparison of the western powers and the Soviet bloc. A study prepared by the Legislative Reference Service of the Library of Congress. Washington, D.C.: U.S. Government Printing Office, 1955. 9″. Pp. 339.

[This contains a variety of data on growth trends in the United States, Canada, Western Europe, the U.S.S.R. and the other East European countries. The chief indices considered are those relating to population and man-power, agriculture and food supply, raw materials, steel, power resources, transportation and foreign trade. While much useful information is given, the pervasive desire to disparage the performance of the communist countries gives a very partisan tone to the report.]

INTERNATIONAL

INTERNATIONAL MONETARY FUND. Seventh Annual Report on Exchange Restrictions 1956. Washington, D.C.: International Monetary Fund, 1956. 9″. Pp. 371.

[The detailed account of regulations in individual countries is preceded by a brief general survey of the progress made towards reducing exchange restrictions during the period under review.]

ORGANISATION FOR EUROPEAN ECONOMIC CO-OPERATION. Europe's Growing Needs for Energy. How Can They be Met? A report prepared by a group of experts. Paris: O.E.E.C., 1956. 9½″. Pp. 120. 8*s*.

[The present position with regard to production and consumption of energy in Europe is analysed, and forecasts are given of probable trends in the next twenty years. It is estimated that the proportion of net imports of primary energy to total consumption, which is at present around 20%, is likely to rise to nearly twice that figure by 1975. More detailed analysis follows of ways in which this situation can be met.]

ORGANISATION FOR EUROPEAN ECONOMIC CO-OPERATION. Liberalisation of Europe's Dollar Trade. Paris: O.E.E.C., 1956. 9½″. Pp. 135. 8*s*.

[This report describes the measures that have been taken by O.E.E.C. countries to relax restrictions on commodity trade and invisible transactions with the dollar world. Steps taken by the United States and Canada affecting their trade relations with O.E.E.C. are also dealt with. An attempt is made to assess the effects of the measures so far taken and to consider future prospects. It is suggested that the marked increase in dollar imports of raw materials and basic commodities in the last few years has been not so much the result of liberalisation itself as of increased economic activity in the importing countries. The authors recognise that the danger of capital outflow seriously influences many countries in retaining control over invisible items, but they suggest that the success with which this control has been relaxed in some countries might justify others in following suit to a limited extent as an experiment.]

UNITED NATIONS FOOD AND AGRICULTURE ORGANISATION. Yearbook of Food and Agricultural Statistics, 1955: Production. Rome: F.A.O., 1956. 10½″. Pp. 427. 17*s*. 6*d*.

[The greater part of this yearbook is devoted to statistics relating to crop production and livestock numbers and products. Other topics treated include the use of fertilisers, farm machinery and insecticides, and the prices of agricultural commodities. An innovation in this year's issue of the yearbook is the inclusion throughout of data for the post-war average 1948–52. Figures are also given where available of the pre-war average 1934–38, and most data are carried up to 1954.]

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On a Particular Aspect of Consumption Taxes . . . . . MAURO FASIANI
Riforma Sociale, 1930

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Weltwirtschaftliches Archiv. 1939

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Transactions of the Leningrad Industrial Institute, 1939, and *Transactions of the Leningrad Polytechnic Institute*, 1946

On the Theory of Economic Planning . . . . . HERBERT ZASSENHAUS
Zeitschrift für Nationalökonomie, 1934

Developments in the Danish Money and Capital Markets, 1948–1953 . HEINRICH SCHLEBAUM LARSEN
Nationalökonomisk Tidsskrift, 1954

The Principles of Railway Rates for Passengers . . . . . GUSTAV CASSEL
Archiv für Eisenbahnwesen, 1900

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Printed in Great Britain by Richard Clay and Company, Ltd., Bungay, Suffolk